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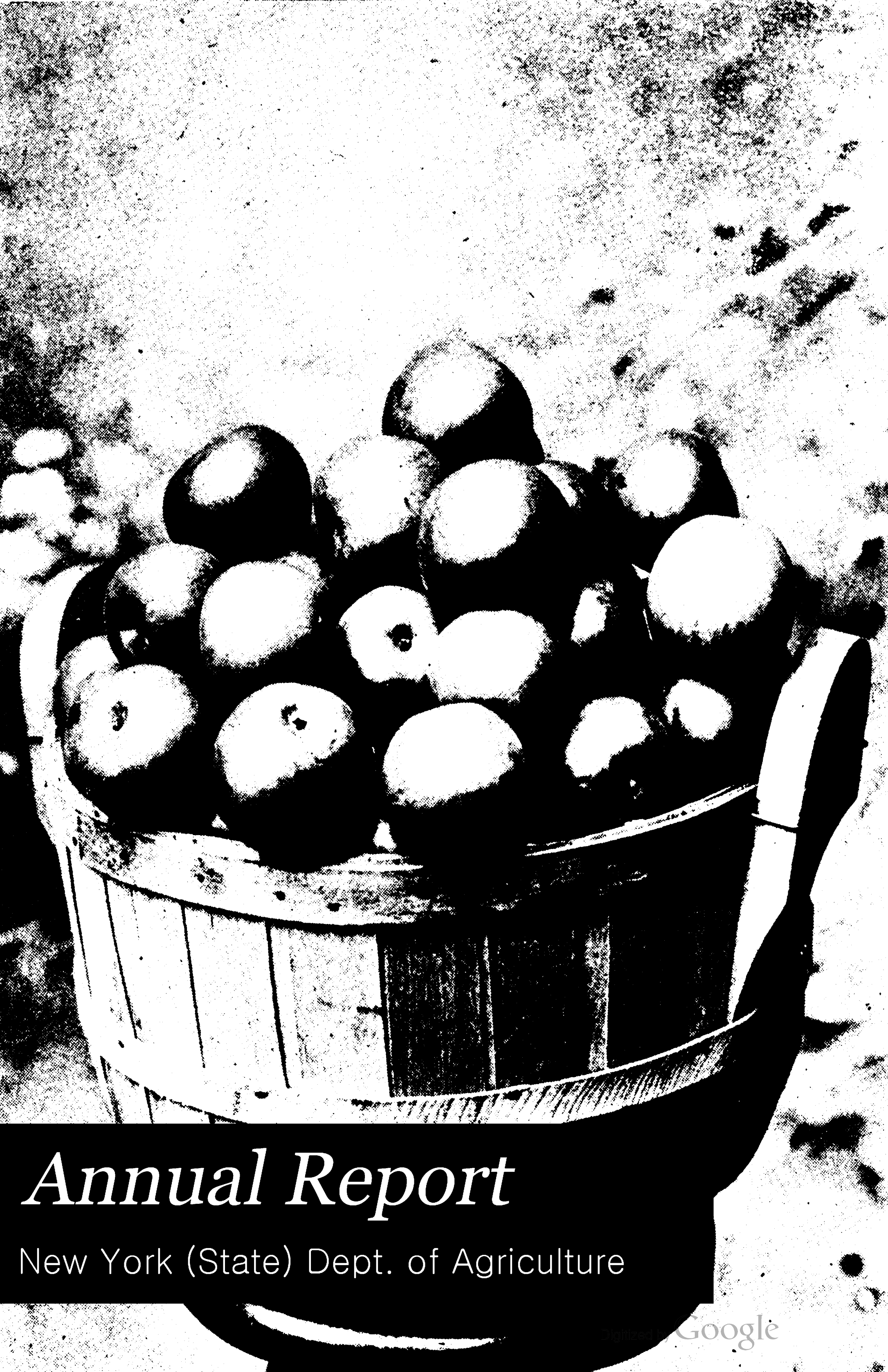
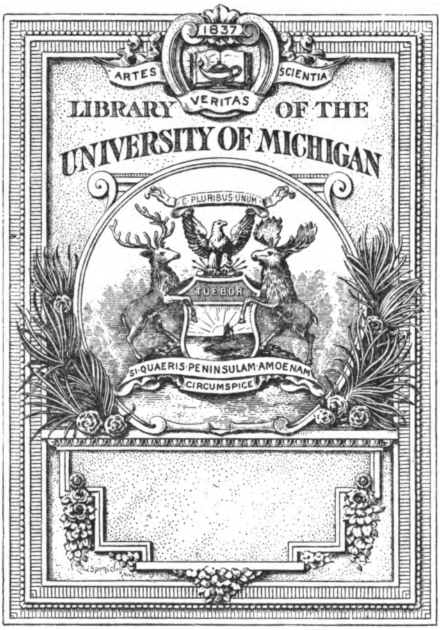


Annual Report

New York (State) Dept. of Agriculture



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STATE OF NEW YORK—DEPARTMENT OF AGRICULTURE

BUREAU
OF
FARMERS' INSTITUTES

REPORT FOR YEAR 1902

C. A. WIETING, - - - - - *Commissioner of Agriculture*
F. E. DAWLEY, - - - - - *Director of Institutes*

TRANSMITTED TO THE LEGISLATURE JANUARY 15, 1903.

ALBANY:
THE ARGUS COMPANY, PRINTERS.
1903.

Report of the Bureau of Farmers' Institutes.

Honorable Charles A. Wieting, *Commissioner of Agriculture, Albany, N. Y.:*

Dear Sir.— It gives me pleasure to hand you my report for the year 1902, together with some of the papers read at the meetings and a few of the question box discussions. The attendance during the past year has been fully up to the average and the interest manifested in the meetings has never before been equalled. Nearly 1,300 applications for meetings were received and 250 meetings of 1,118 sessions were held, with a total attendance of over 90,000. The addresses and discussions have covered a very wide range of agricultural thought and labor. In fact, all branches of agriculture which are being pursued in New York State have been covered by specialists and experts in the localities where the various interests are most prominent. The subject of good roads has been taken up by various members of our institute staff as well as by Honorable Frank D. Lyon, who was detailed to us from the State Engineer's office, and the Higby-Armstrong and Fuller laws have been fully explained in various sections of the State. The interest which the farmers have taken in these lectures has been very marked. Ofttimes they have objected to addresses on good roads, when offered them, but without exception I believe they have been interested and at the close of the meeting have been thankful that the subject had been so thoroughly discussed before them. A marked sentiment in favor of better highways and general road improvement is being developed throughout the State, and the antagonism which has existed in some sections is almost wholly removed. The Department of Public Instruction has also furnished a large number of speakers from among their trained institute workers who have done much to awaken an interest among the farmers in better schools, and our people are certainly taking far more interest in the country school as a whole than they have in former years. While these two branches of work are not strictly agricultural, they are so closely allied to our farmers prosperity that I believe it wise that co-operation between these departments of the State and our own be encouraged and continued.

Among the speakers who have assisted us at institutes during the past winter are Dr. W. H. Jordan, Director New York Agricultural Experiment Station, Geneva; Prof. I. P. Roberts, Dean of the College of Agriculture of Cornell University; Prof. L. H. Bailey of Cornell University; Dr. L. L. Van Slyke, Chemist New York Agricultural Experiment Station, Geneva; Prof. E. B. Vorhees, Dean of College of Agriculture, New Jersey State College; Hon. O. C. Gregg, Lynd, Lyon county, Minnesota; Hon. James Robertson, Dairy Commissioner for the Province of Ontario; Mr. C. W. Brodhead of Pennsylvania; Dr. A. A. Brigham of Rhode Island; Hon. John Gould of Ohio; Dr. J. C. Curryer of Minnesota; Prof. Frank Benton, United States Department of Agriculture, Washington; Hon. J. H. Hale, South Glastonbury, Connecticut; Prof. L. R. Jones of Vermont; Mr. R. M. Kellogg, noted strawberry specialist, of Michigan; Mr. C. D. Lane of the New Jersey State Experiment Station; Hon. E. B. Norris, Master of New York State Grange; Prof. T. E. Orr, Secretary of American Poultry Association, of Pennsylvania; Hon. C. S. Plumb of

Ohio College of Agriculture; Mr. Ernest R. Root, noted bee specialist of Ohio; Prof. H. E. Van Deman, ex-Pomologist of the United States Department of Agriculture; Miss Anna Barrows of Boston, beside almost the entire staff of the New York Agricultural Experiment Station at Geneva and of the Agricultural College at Cornell University. With these men have been associated a large number of specialists and successful farmers from our own State, and the meetings which we have held have been as strong as it was possible to make them.

The discussions following the addresses and queries of the question box show that the interest is remarkably well maintained, and that the people are anxious to know of the matters of which our instructors are treating. The special poultry institutes which we have held in various sections of the State are very interesting and the attendance is large. At these meetings the more technical work of poultry keeping is taken up in a manner which would, perhaps, not be specially interesting at the regular farmers' institutes, and breeders of thoroughbred fowls and breeders of show stock come many miles, often clear across the State, to attend the meetings. The special bee institutes which we are holding each winter are thoroughly appreciated by the bee keepers, although the attendance at them is not large. The expense of holding them is very light, as the United States Department of Agriculture this year furnished us Prof. Frank Benton, their expert in bee culture, and we had only to pay his expenses. In these meetings the bee keepers are learning more about handling their stock and are gaining much information regarding the diseases which afflict bees and their prevention. The summer spray institutes which we held last year during the growing season, giving demonstrations as to the use of different nozzles and power spraying machinery, also showing the results from spraying with a high pressure, were very satisfactory. At one of these in an audience of about 300 people, thirty counties of our own State, five States and the Dominion of Canada were represented.

The Bureau of Farmers' Institutes is indebted to the assistant commissioners and employees of your Department, to the College of Agriculture of Cornell University, to the New York Agricultural Experiment Station at Geneva, to the officers of the State Grange, to the State Breeders' Association, to the State Fruit Growers' Association, to the State Bee Keepers' Association and to the Western New York Horticultural Society, beside many county and local fair associations and local farmers' organizations, for the hearty support and kindly appreciation of its work. Without our close and harmonious connection with these various bodies who are interested in the promotion of New York State's agriculture it would be impossible for us to make the institutes the success which they appear to be.

The following is a list of those who have assisted us at the institutes in various capacities during the year:

Prof. L. H. Bailey.
Charles S. Banks.
Miss Anna Barrows.
Prof. S. A. Beach.
W. T. Becker.
Frank Benton.
C. W. Brodhead.
E. J. Brownell.
Andrew Baker.
W. H. Blodget.
A. A. Brigham.
C. Beseler.
N. O. Booth.
David N. Brice.
Frank D. Blodgett.
F. A. Converse.
H. E. Cook.
B. J. Case.
George W. Cavanaugh.
C. E. Chapman.
C. W. Clark.
Prof. John Craig.
J. C. Curryer.
Fred W. Card.

W. B. Cleves.
J. R. Cornell.
E. A. Callahan.
C. C. Cole.
H. W. Collingwood.
V. A. Clark.
J. H. Drevenstedt.
Franklin Dye.
John A. Ennis.
M. Davenport.
G. M. Doolittle.
Charles M. Day.
Carrie L. Dawley.
Annie Dewey.
A. R. Eastman.
L. J. Farmer.
Dr. E. P. Felt.
Seth Fenner.
James E. Furlong.
V. E. Fuller.
B. D. Gilbert.
C. P. Goodrich.
John Gould.
F. Greiner.
W. N. Giles.
O. C. Gregg.
Fred E. Gott.
A. R. Gunnison.
Mabel B. Haven.
F. H. Hall.
H. A. Harding.
D. P. Hardy.
W. Z. Hutchinson.
George H. Hyde.
Hon. J. H. Hale.
O. H. Hale.
A. D. Harrington.
William A. Irwin.
C. W. Jennings.
John Jeannin, Jr.
W. H. Jenkins.
L. R. Jones.
Dr. W. H. Jordan.
Mrs. S. N. Judd.
Prof. W. G. Johnson.
A. L. Knisely.
R. M. Kellogg.
H. Mason Knox.
C. B. Lane.
Colon C. Lillie.
A. L. Litchard.
A. W. Litchard.
Mrs. B. B. Lord.
Prof. V. H. Lowe.
W. McLeod.
T. F. McGrew.
Charles Mann.
Louise Miller.
Mrs. George W. Monroe.
F. W. Moot.
D. W. McLaury.
Prof. V. A. Moore.
Hon. E. B. Norris.
T. E. Orr.
Prof. P. J. Parrott.
Prof. C. S. Plumb.
George T. Powell.
C. M. Peck.
I. Robertson.
Ernest R. Root.
J. E. Rice.
Charles H. Royce.
Miss Eva R. Root.
F. L. Sibley.

Dr. C. D. Smead.
George A. Smith.
M. V. Slingerland.
Abel F. Stevens.
F. C. Stewart.
J. L. Stone.
Rufus Stanley.
E. M. Sautee.
J. Fred Schlappi.
F. A. Sirrine.
Franklin A. Taber.
Julia D. Taber.
F. B. Terry.
W. Kay Tewksberry.
Ida E. Tilson.
Carrie E. S. Twing.
G. M. Twitchell.
R. L. Taylor.
F. G. Tice.
E. Van Alstyne.
Henry Van Dreser.
H. E. Van Deman.
Dr. L. L. Van Slyke.
E. B. Vorhees.
A. R. Ward.
J. O. Wadsworth.
S. D. Willard.
Frank D. Ward.
M. D. Williams.
Hon. D. P. Witter.
James Wood.
J. S. Woodward.
H. H. Wing.
Miss Lillian M. Wilson.
J. E. Wing.
Mrs. Helen Wells.
H. O. Woodworth.

List of Farmers' Institutes for 1902.

The following is a list of the meetings held from January 1, 1902, to January 1, 1903:

Place.	County.	Date.
Rushville	Yates	Jan. 2–3
Manlius	Onondaga	Jan. 3–4
East Greenbush	Rensselaer	Jan. 3–4
Bristol Springs	Ontario	Jan. 4
Bridgeport	Madison	Jan. 6
Cohocton	Steuben	Jan. 6–7
Fort Ann	Washington	Jan. 6–7
Adams Centre	Jefferson	Jan. 6–7
North Syracuse	Onondaga	Jan. 7
Lysander	Onondaga	Jan. 8
Syracuse	Onondaga	Jan. 8–9
Bath	Steuben	Jan. 8–9
Glens Falls	Warren	Jan. 8–9
Cape Vincent	Jefferson	Jan. 8–9
Fulton	Oswego	Jan. 10–11
Prattsburgh	Steuben	Jan. 10–11
Argyle	Washington	Jan. 10–11
Theresa	Jefferson	Jan. 10–11
Central Square	Oswego	Jan. 13–14
Avoca	Steuben	Jan. 13–14
Gansevoort	Saratoga	Jan. 13–14
Brier Hill	St. Lawrence	Jan. 13
Lisbon Center	St. Lawrence	Jan. 14
Pulaski	Oswego	Jan. 15–16
Arkport	Steuben	Jan. 15–16
Wayville	Saratoga	Jan. 15
Madrid	St. Lawrence	Jan. 15–16
Greenfield Center	Saratoga	Jan. 16
Hannibal	Oswego	Jan. 17–18
Jasper	Steuben	Jan. 18
Burnt Hills	Saratoga	Jan. 17–18
Gouverneur	St. Lawrence	Jan. 17–18
Whitesville	Allegany	Jan. 17
Cato	Cayuga	Jan. 20–21
Addison	Steuben	Jan. 20–21
Canaan	Columbia	Jan. 20–21

FARMERS' INSTITUTES—Continued.

Place.	County.	Date.
Copenhagen	Lewis	Jan. 20–21
Wolcott	Wayne	Jan. 22–23
Irondequoit	Monroe	Jan. 21
Rochester	Monroe	Jan. 22–23
Coopers Plains	Steuben	Jan. 22–23
Hudson	Columbia	Jan. 22–23
Lowville	Lewis	Jan. 22–23
Rhinebeck	Dutchess	Jan. 23–24
Williamson	Wayne	Jan. 24–25
Big Flats	Chemung	Jan. 24–25
Marlboro	Ulster	Jan. 24–25
Lyon Falls	Lewis	Jan. 24–25
Penn Yan	Yates	Jan. 27
Webster	Monroe	Jan. 27–28
Van Etten	Chemung	Jan. 27–28
Fishkill	Dutchess	Jan. 27–28
Trenton	Oneida	Jan. 27
Hilton	Monroe	Jan. 28
Marcy	Oneida	Jan. 28
Carlton Station	Orleans	Jan. 29
Wellsburg	Chemung	Jan. 29–30
Yorktown	Westchester	Jan. 29–30
Camden	Oneida	Jan. 29–30
Newfane	Niagara	Jan. 30–31
Higginsville	Oneida	Jan. 30
Beaver Dams	Schuyler	Jan. 31, Feb. 1
Hicksville	Nassau	Jan. 31, Feb. 1
Clinton	Oneida	Jan. 31, Feb. 1
Ransomville	Niagara	Feb. 1
Charlton	Saratoga	Feb. 1
Marilla	Erie	Feb. 3–4
Tyrone	Schuyler	Feb. 3–4
Riverhead	Suffolk	Feb. 3–4
Vernon	Oneida	Feb. 3–4
Akron	Erie	Feb. 5–6
Alpine	Schuyler	Feb. 5–6
Bridgehampton	Suffolk	Feb. 5
Stockbridge	Madison	Feb. 5–6
Mecklenburg	Schuyler	Feb. 6–7
Northport	Suffolk	Feb. 6
Batavia	Genesee	Feb. 7–8
Spencer	Tioga	Feb. 7–8
Hamilton	Madison	Feb. 7–8
Arcade	Wyoming	Feb. 10–11
Waverly	Tioga	Feb. 10–11
Spring Valley	Rockland	Feb. 10–11

FARMERS' INSTITUTES—Continued.

Place.	County.	Date.
West Eaton	Madison	Feb. 10–11
Warsaw	Wyoming	Feb. 12–13
Nichols	Tioga	Feb. 12–13
Unionville	Orange	Feb. 12–13
De Ruyter	Madison	Feb. 12–13
New York	New York	Feb. 12
Perry	Wyoming	Feb. 14–15
Dryden	Tompkins	Feb. 14–15
Liberty	Sullivan	Feb. 14–15
Cincinnatus	Cortland	Feb. 14–15
Syracuse	Onondaga	Feb. 15
Fort Hill	Genesee	Feb. 17–18
Straits Corners	Tioga	Feb. 17
Monticello	Sullivan	Feb. 17–18
McDonough	Chenango	Feb. 17–18
Berkshire	Tioga	Feb. 18
Livonia	Livingston	Feb. 19–20
West Groton	Tompkins	Feb. 19–20
Washingtonville	Orange	Feb. 19–20
Dresserville	Cayuga	Feb. 20
Albion	Orleans	Feb. 21–22
Ludlowville	Tompkins	Feb. 21–22
Red Hook	Dutchess	Feb. 21–22
Syracuse	Onondaga	Feb. 22
Pleasant Valley	Dutchess	Feb. 25
Medina	Orleans	Feb. 24–25
Lodi	Seneca	Feb. 24–25
Pine Plains	Dutchess	Feb. 24–25
Oxford	Chenango	Feb. 24–25
Ithaca	Tompkins	Feb. 26
Spencerport	Monroe	Feb. 26–27
Halls Corners	Ontario	Feb. 26–27
Freehold	Greene	Feb. 26–27
Plymouth	Chenango	Feb. 26–27
Brockport	Monroe	Feb. 28, Mar. 1
Phelps	Ontario	Feb. 28, Mar. 1
South Bethlehem	Albany	Feb. 28, Mar. 1
South New Berlin	Chenango	Feb. 28, Mar. 1
Palmyra	Wayne	Mar. 3–4
Cheshire	Ontario	Mar. 3
Voorheesville	Albany	Mar. 3–4
Harpursville	Broome	Mar. 3–4
Ionia	Ontario	Mar. 4–5
Lake Placid	Essex	Mar. 4–8
Ira	Cayuga	Mar. 5–6
Deposit	Broome	Mar. 5–6

FARMERS' INSTITUTES—Continued.

Place.	County.	Date.	
Honeoye	Ontario	Mar.	6
Skaneateles	Onondaga	Mar.	7–8
Scottsville	Monroe	Mar.	7–8
Lyndonville	Orleans	Mar.	7–8
Sidney Center	Delaware	Mar.	7–8
Brookfield	Madison	Mar.	10–11
Fishers	Ontario	Mar.	10–11
Oneonta	Otsego	Mar.	10–11
Chadwicks	Oneida	Mar.	11–12
West Exeter	Otsego	Mar.	12–13
Hobart	Delaware	Mar.	12–13
Garrattsville	Otsego	Mar.	14–15
Delhi	Delaware	Mar.	14–15
Russia	Herkimer	Mar.	17–18
Ithaca	Tompkins	Mar.	17
Schenevus	Otsego	Mar.	17–18
Herkimer	Herkimer	Mar.	19–20
Sharon Springs	Schoharie	Mar.	19–20
Middleburg	Schoharie	Mar.	20–21
Fort Plain	Montgomery	Mar.	21–22
Central Bridge	Schoharie	Mar.	21–22
Mayfield	Chautauqua	Mar.	24–25
Esperance	Schoharie	Mar.	24
Pattersonville	Schenectady	Mar.	25
Johnstown	Fulton	Mar.	26–27
Fultonville	Montgomery	Mar.	26–27
Scotia	Schenectady	Mar.	26–27
Halls Corners	Ontario	Mar.	27
Niagara Falls	Niagara	Mar.	29
Clarence Center	Erie	April	9
Watertown	Jefferson	April	26
Chadwicks	Oneida	April	28
Watertown	Jefferson	May	24
Oak Orchard	Orleans	June	2–3
Fillmore	Allegany	June	3
Gilboa	Schoharie	June	20
Rushford	Allegany	July	1
Fultonham	Schoharie	July	9
Three Rivers	Oswego	Aug.	2
Maryland	Otsego	Aug.	8
Milford	Otsego	Aug.	8
Charlton	Saratoga	Aug.	13
Yorktown	Westchester	Aug.	21
Cobleskill	Schoharie	Aug.	21–22
West Sand Lake	Rensselaer	Aug.	23
North Franklin	Delaware	Aug.	24

FARMERS' INSTITUTES—Continued.

Place.	County.	Date.
Hensonville	Greene	Aug. 29
Lockport	Niagara	Aug. 30
Halcottsville	Delaware	Sept. 25–26
Summit	Schoharie	Oct. 15
Woodville	Jefferson	Nov. 10–11
Plessis	Jefferson	Nov. 12–13
Lisbon Center	St. Lawrence	Nov. 14–15
Nicholville	St. Lawrence	Nov. 17–18
South Bethlehem	Albany	Nov. 17–18
Freehold	Greene	Nov. 17–18
Fort Covington	Franklin	Nov. 19–20
Westerlo	Albany	Nov. 19
Greenville Centre	Greene	Nov. 19
Preston Hollow	Albany	Nov. 20
South Westerlo	Albany	Nov. 20
Brushton	Franklin	Nov. 21–22
Breakabeen	Schoharie	Nov. 21–22
Durham	Greene	Nov. 21
Chateaugay	Franklin	Nov. 24–25
Jefferson	Schoharie	Nov. 24–25
Ellenburg Centre	Clinton	Nov. 26
Mooers	Clinton	Nov. 28–29
Grand Gorge	Delaware	Nov. 28–29
Somerset	Niagara	Nov. 29
West Chazy	Clinton	Dec. 1–2
Halcottsville	Delaware	Dec. 1–2
Clarence Centre	Erie	Dec. 1–2
Willsboro	Essex	Dec. 3–4
Lexington	Greene	Dec. 3–4
Collins Centre	Erie	Dec. 3–4
Penn Yan	Yates	Dec. 4
Lewis	Essex	Dec. 5–6
Mount Vision	Otsego	Dec. 5–6
Little Valley	Cattaraugus	Dec. 5–6
Crown Point	Essex	Dec. 8–9
Morris	Otsego	Dec. 8–9
Panama	Chautauqua	Dec. 8
Jamestown	Chautauqua	Dec. 9–12
Franklin	Delaware	Dec. 10
Carlisle	Schoharie	Dec. 10–11
Putnam	Washington	Dec. 10–11
Fort Ann	Washington	Dec. 12–13
Hamden	Delaware	Dec. 12–13
East Worcester	Otsego	Dec. 12–13
Franklinville	Cattaraugus	Dec. 12–13
Clymer	Chautauqua	Dec. 12–13

FARMERS' INSTITUTES—Concluded.

Place.	County.	Date.
Argyle	Washington	Dec. 15–16
Downsville	Delaware	Dec. 15–16
Schenevus	Otsego	Dec. 15–16
Warsaw	Wyoming	Dec. 15–16
Easton	Washington	Dec. 17–18
Deposit	Broome	Dec. 17–18
South New Berlin	Chenango	Dec. 17–18
Rochester	Monroe	Dec. 17–18
Fillmore	Allegany	Dec. 17–18
Granville	Washington	Dec. 19–20
Windsor	Broome	Dec. 19–20
West Exeter	Otsego	Dec. 19–20
Rushford	Allegany	Dec. 19–20
Arcade	Wyoming	Dec. 19–20
Syracuse	Onondaga	Dec. 20
Hoosick Falls	Rensselaer	Dec. 22–23
Greene	Chenango	Dec. 22–23
Belfast	Allegany	Dec. 22–23
Gainesville	Wyoming	Dec. 22
Brookfield	Madison	Dec. 22–23
Fayetteville	Onondaga	Dec. 23
Perry	Wyoming	Dec. 23–24
Wayville	Saratoga	Dec. 24
Elbridge	Onondaga	Dec. 26
Wilson	Niagara	Dec. 27
Syracuse	Onondaga	Dec. 27
Skaneateles	Onondaga	Dec. 29–30
Cortland	Cortland	Dec. 30–31
Hartwick	Otsego	Dec. 30

Aside from the regular farmers' institutes, special bee keepers' institutes were held during the year at the following places:

Rochester,
Canandaigua,
Romulus,
Auburn,
Fonda,
Fulton.

QUESTION BOX.

At our institutes about two-fifths of the entire time is taken up in discussions in the form of a question box. As these discussions are ofttimes the most valuable portion of the institute, I have thought best to give in detail a number of the questions with their answers and not use quite so much of the space in the report for set papers. In studying this portion of the report do not feel that because there is some variation in the answers to the different questions by different workers that the value of the question box is lost. Different men look at things from different points of view, and as a general thing you will find that, were the questions answered a little more fully in all the salient points under discussion the workers would agree.

In this year's report we have departed somewhat from our usual practice, and instead of giving some of the addresses which have been delivered by our regular speakers, have selected some of the best papers which were read during the winter by the local people at the various institutes, and believe that from a careful perusal of these the reader will be benefited. We have also printed some of the addresses of our regular workers.

A FEW OF THE

PAPERS AND ADDRESSES

OF THE

INSTITUTES OF 1902.

Spraying.

By F. E. Dawley.

None of the newer agricultural practices are demonstrating their value and becoming generally adopted more rapidly than the practice of spraying. The principal reason for this is that the results are so apparent to any observing farmer. A few years ago we had an idea that spraying was only for more advanced horticulturists who were anxious to grow the very finest quality of fruit, and many practical growers got the idea that none except those who had a market for strictly fancy fruit at prices in advance of the ordinary market could afford to do the work. In horticulture this has clearly been proven a fallacy, and most of our practical orchardists to-day are as familiar with the use of the spray pump and the various spray formulas and mixtures as are the experimentalists. It is not only the horticulturist now who is a thorough advocate of spraying, but the general farmer finds that many of the insects which infest their grains, the Colorado beetle, flea beetle and blight in potatoes, the green pea louse, the various smuts in corn and oats, anthracnose in the bean and rust and beetles in the asparagus, will readily succumb to treatment with the spray pump. In the following compilation no claim is made for originality. It is simply the gathering together of the best and latest information in relation to the treatment which the various farm crops should receive for the insects and diseases which are combated by spraying with various mixtures.

We shall first give the formulas which are generally accepted as best for the different sprays, and follow with instructions as to the best methods of application.

FORMULAS.

AMMONIA SOLUTION COPPER CARBONATE.

5 ozs. copper carbonate; 3 pts. ammonia;
50 gals. water.

Use just enough ammonia (if strong, diluted with several volumes of water) to dissolve the copper carbonate; then dilute to final volume. This fungicide is not as good as Bordeaux, but is used where no sediment is desired on the foliage or fruit.

ARSENATE OF LEAD.

3 lbs. in 50 gals. of water.

Apply to foliage for elm leaf beetle and all biting insects. May be added to Bordeaux mixture.

BORDEAUX MIXTURE.

4 lbs. copper sulphate; 4 lbs. fresh lime;
40 to 50 gals. water.

Dissolve the copper sulphate in hot water or from a coarse bag suspended in cold water; slake the lime separately. Dilute the former to about 20 gals., into which pour the lime diluted to about 10 gals., stirring the mixture; dilute further to form the 40 to 50 gals. Stock solutions of the copper sulphate or lime, rate 1 lb. to 1 gal. water, can be kept indefinitely.

CARBON BISULPHIDE.

Used to kill insects infesting stored grain, in tight bins. Use 1 lb. for 100 bushels of grain.

COMMON SOAP.

1 lb. in 8 gals. water.

Spray upon foliage to kill red spider, plant-lice and other sucking insects.

COPPER SULPHATE.

3 to 4 lbs. copper sulphate; 50 gals. water.

This strength can be used only as a winter spray; sometimes a weaker solution, 1 lb. to 250 gals. water, is used on the foliage.

DILUTE BORDEAUX MIXTURE.

2 lbs. copper sulphate; 2 lbs. fresh lime;
50 gals. water.

This is used on such plants as the peach and Japanese plum, whose foliage is injured by the stronger mixture.

FORMALIN.

A. 1 lb. (1 pt.) formalin, 50 gals. water; grain smut.

B. 1 lb. (1 pt.) formalin, 30 gals. water; potato scab.

a. Thoroughly sprinkle the grain, stirring during the process; leave in piles for several hours.

b. Soak the seed potatoes in the liquid for about two hours.

HELLEBORE.

May be dusted on the plants, or mixed with water 1 oz. in 2 gals. For currant worm and asparagus beetle.

HYDROCYANIC ACID GAS.

1 oz. cyanide of potash; 2 ozs. sulphuric acid; 4 ozs. water;
for each 100 cubic feet space.

Place the acid and water in an earthen jar in the house, and when all is ready, drop in the cyanide, close the house and keep away from it for half an hour. Then ventilate for ten minutes before going inside. This is for dormant trees. In greenhouse use 1 oz. of cyanide for each 100 cubic feet of space. *Hydrocyanic acid gas and the chemicals composing it should be handled with great caution, as the gas and chemicals are extremely dangerous to life.*

KEROSENE EMULSION.

2 gals. kerosene; ½ lb. common soap;
1 gal. water.

Dissolve the soap in hot water, add the kerosene, and churn all together until a white creamy mass is formed which thickens on cooling. Dilute nine times before using.

LIME, SULPHUR AND SALT MIXTURE.

30 lbs. lime; 20 lbs. sulphur; 15 lbs. salt; 60 gals. water.

Boil for one hour, and apply while fresh to dormant trees to kill San José scale.

PARIS GREEN.

1 lb. Paris green; 3 lbs. lime; 100 gals. water.

Spray upon foliage to kill potato beetle, elm leaf beetle, and all biting insects. Commonly used with Bordeaux mixture.

POTASSIUM SULPHIDE.

3 ozs. potassium sulphide; 10 gals. water.

This is used chiefly to prevent the mildews.

RESIN BORDEAUX MIXTURE.

5 lbs. resin; 1 lb. potash; 1 pt. fish oil; 5 gals. water.

Dissolve resin in kettle of oil heated over fire; cool slightly; add lye, slowly stirring; then add water and boil until mixture will dissolve thoroughly in cold water. Use 2 gallons of this to 48 gallons of Bordeaux. This mixture is useful where ordinary Bordeaux will not readily adhere to the plants.

TREATMENT.

APPLE.

Insects.

Bud Moth.—Caterpillars feed upon the unfolding leaves. Spray with Paris green or arsenate of lead before buds open, repeating a few days later. The arsenate of lead treatment is probably best for this insect, as it holds on the foliage better than the Paris green.

Codling Moth, commonly known as Apple Worm.—This is the caterpillar which tunnels inside the fruit and is found often in eating the apple during the winter. Spray as soon as blossoms fall, while the calix of the apple is still expanded and turned upward, with Paris green or arsenate of lead. This can be applied with Bordeaux and should be put on repeatedly, keeping the foliage well covered with the mixture until the fruit is nearly grown.

Curculio.—The grub tunnels inside the fruit, making it gnarled and ill-shaped. This insect is hard to combat, but treatment as recommended for codling moth seems to be most effective.

Canker Worm.—This insect feeds upon the leaves and spins down on threads when disturbed. The treatment recommended for the codling moth will be effective.

Tent-Caterpillar.—Forms nests on the branches in May and devours the leaves. The most effective method of combating is to destroy the egg mass in winter, while the trees are bare of foliage, and remove the nests as soon as they appear. The treatment recommended for the codling moth will have some effect in keeping down the tent-caterpillar.

Maggot or Railroad Worm.—Tunnels through the pulp of the fruit. The most effective treatment is to destroy all infested fruit.

San José Scale.—It is hoped that we may have more positive information as to combating this pest before many years, and with the number of careful experimenters who are at work looking for successful methods of exterminating it we probably will. The best treatment at the present time is probably to spray thoroughly with lime, sulphur and salt mixture on dormant trees in winter, with 25 per cent. crude petroleum and water in early spring, just before the buds start, and a further application of 15 per cent. kerosene and water applied to the trees in foliage to prevent the young from spreading from tree to tree during the summer.

Scurfy Bark Louse and Oyster-Shell Bark Louse.—These are scale insects which infest the bark and suck the sap from the twigs. Spraying with soap and water or a kerosene emulsion will destroy these, if applied about the second week in June.

Borer.—These burrow in the base of the trunk. The most successful treatment is to watch the trees and dig out the borers, or kill them with a wire as often as the castings appear about the base of the tree.

Fungi.

Bitter Rot.—It is quite clearly proven that the canker on the branches of the apple trees and the bitter, depressed, rotted areas on the fruit are two forms of the same disease. The cankered branches should be cut out as soon as noticed and the rotten fruit removed. In winter the trees should be sprayed thoroughly with Bordeaux and ammoniated solution copper carbonate. If a serious outbreak occurs during the summer season this spray can be used repeatedly.

Rust.—This shows as orange-colored blotches on the leaves, later developing into fringed clustered cups. Rarely shows on fruit or twigs. It is supposed to spread to the apple from the cedar apples, which appear in early spring on the red cedar. All red cedars near apple orchards should be destroyed. There is a great difference in the susceptibility of different varieties to this disease. I am not convinced that spraying is of any value.

Scab.—Of all the fungi this is the one which New York State apple growers have most to dread. Spraying with Bordeaux mixture just as the leaf buds are unfolding and before the blossoms open, again after the petals fall and again about ten days later should give very satisfactory results. If the season is a rainy one, it may be well to repeat the spraying the fourth time. If the orchard is badly infested, a winter spraying with copper sulphate before the buds swell is quite effective.

To sum up the whole matter of spraying apple orchards, it might be said that we can protect ourselves against all these difficulties, except scale insects and borers, by spraying,

1. Just before the buds start, with a copper sulphate solution.
2. Just as the leaves are unfolding, using Paris green or arsenate of lead in Bordeaux, and
3. Repeating this spray just after the petals fall.
4. If any of the difficulties are very troublesome, a fourth spraying ten days later will sometimes prove of value.

ASPARAGUS.

Insects.

Asparagus Beetle.—This insect is rapidly making its way into the central and western part of the State, although it has been troublesome in the Hudson river valley and Long Island for some time. Both the adults and the larva devour the foliage. From the fact that the insect feeds on the same portion of the plant which is used for human food, it is hard work to combat it. Early in the season keeping the bed cut close prevents the females from finding lodgment for their eggs, and after cutting is discontinued repeated spraying with hellebore will rid the asparagus fairly well of the insect.

Fungi.

Rust.—In its most conspicuous stage the rust shows itself in the form of short reddish or black pustules scattered over the stems. All plants affected in this way should be cut and the plants burned in the fall. Spraying every ten days from July 15th to September 15th with resin Bordeaux partially controls the disease, but it is difficult and the expense is not warranted as a usual thing.

BEANS.

Fungi.

Anthracnose.—This shows on the leaves and pods as roundish discolored areas, often with purplish border. In selecting the seed be careful that none is infected and plant heavily enough so that all infected plants can be cut out. Where very troublesome the crop can be sprayed with Bordeaux, beginning when the plants are but a few inches high and repeating about every ten to fourteen days. In sections where this disease is known the crop should be grown in rotation and old affected vines destroyed.

Blight.—This appears very much as anthracnose does, and by most growers is confounded with it. It is fortunate that the same treatment is required in both cases.

Downy Mildew.—This does most serious damage on the Lima bean, forming white, woolly growths on the pods and young stems. Spraying alternately with Bordeaux and ammonia solution copper carbonate every ten to fourteen days from the last of

June to the first of September is helpful in keeping this disease under control.

BLACKBERRY.

Insects.

Cane Borer.—Cut and burn infested canes.

Fungi.

Leaf Spot.—This manifests itself on the leaves in small circular spots with whitish center and purplish border. It is not usually so serious as to demand attention, but can probably be controlled by the use of Bordeaux.

Orange Rust.—This is one of the best known diseases of cane berries. The fungus is perennial in the underground parts of the plant so that the disease appears year after year. As soon as an infected plant is found it should be dug out and burned. In case white cane fruits are growing in the vicinity, all affected plants should be dug and burned to prevent contagion.

CABBAGE AND CAULIFLOWER.

Insects.

Cabbage Worm.—Devours the leaves. Young plants may be sprayed with Paris green. As soon as the head begins to form this is not safe and should not be used. Red pepper, pyrethrum and field plaster have been recommended. On small areas dashing the forming head with very cold water has been known to give good results.

Aphis.—Sucks sap from the tissues. Spray with soap or kerosene emulsion.

Fungi.

Club Root.—Causes knob-like enlargements on the roots of cabbage, cauliflower and allied plants. The disease germs often become established in the soil and rotation of plants is recommended.

Black Rot.—Extensive experiments are now being conducted to find some remedy for this disease by the New York Agricultural Experiment Station at Geneva. It works more serious injury to the cabbage crop than all other difficulties combined, and as yet no satisfactory method of combating it has been discovered.

CELERY.

Insects.

Celery Caterpillar.—This is the same caterpillar which feeds upon parsley, carrot and parsnip. On celery there seems to be no very good method of combating it except by hand picking. On carrot and parsnip, if the pest becomes serious, any of the poisonous sprays can be used.

Fungi.

Leaf Blight and Leaf Spot.—Our micologists tell us that these are two separate diseases, although most growers consider that they are two forms of the same. Spraying with Bordeaux and ammonia solution copper carbonate are efficient, especially the carbonate, which can be used for the later sprayings. Spray every ten to fourteen days from the time the plant is set until they are banked. This is the most troublesome difficulty and the work must be done very thoroughly to be effective.

CHERRY.

Insects.

Cherry Slug.—Eats away the green portion from the leaf, leaving but a skeleton. Spray with hellebore, Paris green or arsenate of lead.

Aphis.—Sucks the sap from the leaves and the new shoots. If sprayed, before the leaves begin to curl, with soap or kerosene emulsion this insect can be quite satisfactorily combated.

Curculio.—This is probably the same insect which infests the plum, the beetle laying her egg in the young fruit which matures into the well known grub, destroying the fruit and often causing it to fall. It is probable that the best method of combating this insect is to jar the trees each morning for about four weeks after the blossoms fall, catching the beetles on sheets, which have been spread on the ground, and killing them. Some of the wheel implements which carry the sheets are highly recommended, and on level and even ground are very satisfactory. Some recommend spraying with Paris green or arsenate of lead for this insect.

Fungi.

Black Knot.—This well-known fungi forms knot-like excrescences on the twigs of the tree. All infected branches should be cut off and burned as soon as observed. Winter spraying with copper sulphate and later spraying with Bordeaux has been recommended as effective.

Leaf Spot.—This causes numerous purplish spots on the leaves. The spot falling out leaves a hole which has been called from this "shothole." Spraying, if begun early in May, has proven effective in preventing this disease, but the Bordeaux should be used in a diluted condition to avoid injury to the foliage. Several sprayings at intervals of two weeks are recommended.

Powdery Mildew.—This makes a cobweb-like growth over the leaves and in the fall forms minute black bodies on the under surfaces. This disease is sometimes quite serious on young trees, especially in the nursery row. It is controlled by spraying with Bordeaux or potassium sulphide.

CORN.

Insects.

Corn Worm.—This insect eats the immature kernels from the ear. Hand picking and destroying seems to be the most effective remedy.

Corn Weevil.—Occasionally in corn which has grown to maturity from Western seed will be found a small, white maggot which produces a little brownish-gray miller. Dried corn which contains this insect should be treated with bisulphide of carbon.

Fungi.

Smut.—The dusty black, sticky growths that appear on various parts of the corn stalk are well known. It is especially injurious to certain varieties of sweet corn, and, if not positively injurious to animals that partake of the silage or stalks, it makes handling of the corn crop far more unpleasant when it is present. Seed treatment seems to be almost wholly ineffective. Use varieties most exempt from attack and avoid the use of fresh manure, applied after frosts, on the corn land, as the smut propagates in this.

CUCUMBER.

Insects.

Striped Beetle.—Attacks young plants, eating the leaves. Early apply Paris green or arsenate of lead, taking pains to spray the under side of the leaves. Later, if very troublesome, the plants can be covered with screens.

Aphis.—Like all the other aphides, the one infesting the cucumber and melon sucks the sap from the under side of the leaves. In wet weather tobacco stems placed around the young plants may keep them away. Spray the under side of the leaves with soap or kerosene emulsion.

Fungi.

Anthracnose.—This shows in discolored spots on the leaves which run together more or less. It may also occur on the fruit. Repeated sprayings with Bordeaux every ten days during the season, beginning before any of the difficulty shows, is efficient in keeping this disease in check.

CURRANT.

Insects.

Currant Worm.—Devours the foliage. Apply hellebore early in the season.

San José Scale.—See Apple.

Scurfy Bark Louse.—See Apple.

Fungi.

Anthracnose and Leaf Spot.—Both of these are responsible for the spotted leaves and premature shedding. The plant can be sprayed with Bordeaux before the leaves appear, again as they are unfolding and repeated at intervals of ten to fourteen days until the fruit begins to turn.

ELM.

Insects.

Elm-Leaf Beetle.—Adults eat holes through the leaves in May, and later the larva eat away the green part from the under side of the leaves. Spray thoroughly with arsenate of lead early in May to kill the egg-laying beetles and spray the under side of the leaves with the same preparation about the first of June to destroy the larva. Pupa at the base of the trees may be killed with kerosene emulsion or with soap and water.

GOOSEBERRY.

Insects.

Currant Worm.—See Currant.

Gooseberry Fruit Worm.—This feeds inside the berry. A very effective treatment is to destroy the infested berry.

Fungi.

Mildew.—This shows as a dense, dirty, white growth on the fruit and leaves of young shoots. Spray with potassium sulphide as soon as buds break, and repeat every ten days until the first of June.

GRAPE.

Insects.

Flea Beetle.—The adults and larva often feed upon the leaves. Spray with Paris green or arsenate of lead.

Leaf Hopper.—Sucks the sap from the under side of the leaf. Spray the under side of the leaves with kerosene emulsion.

Berry Worm.—Feeds and develops inside the berries. Destroy infested berries before the insects escape.

Sphinx Caterpillars.—Several species feed upon the leaves of the grape. Spray with Paris green and hand-pick when seen.

Fungi.

Black Rot.—This is probably the most serious difficulty with which New York crop growers have to contend, and in some sections in certain seasons has wrought great damage. It usually shows first in reddish-brown spots on the leaves, more rarely on the stems. It shows especially, however, in the rotting berries, which finally become hard, shrunken and wrinkled into so-called black mummies. It is difficult to control by spraying, although this seems to be the only way of combating it. The work should be very thoroughly done and continued through two or more seasons with care. Begin spraying before blossoming, about the first of May, with a second application just after blossoming, and subsequent sprayings at intervals of from seven to ten days. Use Bordeaux up to the first of July, then change to ammonia solution copper carbonate, which should be used until the middle of August. This treatment means that from three to six sprayings with Bordeaux, and from two to four with the carbonate, will be needed, according to the season and the severity of the attack. Persistent treatment has been known to thoroughly eradicate this trouble from a vineyard in which it had caused a complete loss of the crop two seasons before.

Downy Mildew.—This develops in white patches of fungous threads on the under side of the leaves, causing some discoloration on the upper. Is also found on the stems and fruit. Treat the same as for black rot, except that the sprayings can be made at longer intervals.

Powdery Mildew.—This is another of the cobweb-like growths which shows on the upper surface of the leaves, most plainly in the fall when the small round fruiting bodies are found scattered over the surface. Treat as for downy mildew, except that in the late fall, after the fruit is gathered, a fall spraying should be made to kill the winter spores.

LETTUCE.

Aphis or Green Fly.—This sucks the sap from the tissues. Where the lettuce is grown under glass, fumigating with tobacco or hydrocyanic acid gas is very effectual. If the pest is serious in outside beds, spray with soap and water.

MAPLE.

Insects.

Borer.—This insect makes large tunnels in the trunk of the tree, often girdling them. Examine the tree for castings in September. The most effective treatment is to inject bisulphide of carbon into the burrow with a small syringe and stop it up tight with plaster of paris or putty.

MELONS.

Insects.

Striped Cucumber Beetle.—See Cucumber.

Borer.—See Squash.

Aphis.—See Cucumber.

Fungi.

Leaf Mold.—This produces dead spots on the leaves very similar to those caused by the downy mildew. Spray with Bordeaux and repeat every seven to fourteen days.

Downy Mildew.—This forms angular brown, eventually dead, spots in the leaves, often stunting or killing the vines. It is most prominent just before the vines come into bearing, the fruit not maturing or worthless because it lacks flavor. The downy mildew on all the *cucumis* is very hard to control and it is questionable whether anything effective can be done by spraying during a moist season. If spraying is done, the vines should be kept covered with Bordeaux, especially from the middle of July to the middle of August.

OATS.

Fungi.

Smut.—This destroys the grain by a black dusty mass of spores growing in the head. Seed treatment is effective in preventing this. Soaking the seed for ten minutes in water heated from 130 to 135 degrees is very effective. It is difficult, however, to secure thorough work by this plan as the cool oats cool the water so rapidly, and if it is not as hot as 132 degrees the results will not be satisfactory, while if it is higher than 135 degrees the germinating power of the seed will be injured. In practice a safe way is to have three vessels of water, one a kettle under which a fire is burning, another with cold water and another in which the seed is to be dipped, and which can be kept of the required temperature by dipping in either hot or cold water, as is required. The seed to be treated should be put in loose gunny sacks, filled about half full so that it can be shifted from one end to the other and all portions brought in direct contact with the hot water. As soon as soaked it should be spread out and dried thoroughly.

The formalin treatment is most satisfactory, taking less time than the hot water treatment. The oats should be cleaned thoroughly and placed in piles of five bushels each. The formalin, diluted according to directions, can be sprinkled over the grain with a watering pot or spray pump, putting it on slowly so that it will be soaked up by the grain and not run away. As soon as the first five bushels is treated it can be shoveled aside and another amount treated in the same manner, continuing this until all are treated, when they can be left in a pile from eight to ten hours. It will do no harm if left over night, but it is a good plan to cover with coarse sacking. The next day they should be spread and shoveled over, exposing them to the air so that they will dry out and be fit for drilling. This work can be done sometime in advance of the time of sowing, so that the grain will be ready, but it should not be brought in contact with bins, boxes or bags which have contained smutty oats before sowing. In case a thrashing machine comes to your place from a farm where you know smutty oats have been thrashed and your own are clean, it is worth while to thoroughly spray the machine before beginning work.

PEAS.

Insects.

Green Pea Louse.—This insect is rapidly making its way up the State. It sucks the sap from the vines and stems. Spraying with soap and water or before blossoming with kerosene emulsion is effective. Early planting helps.

PEACH.

Insects.

Aphis.—This sucks the sap from the leaves. Spray with soap and water or kerosene emulsion.

Borer.—Tunnels in the base of the trunk. Dig out in late fall and early spring.

Fruit Bark Beetle or Shothole Borer.—Makes tunnels under the bark of branches and trunk. Burn infested trees. Some have recommended the lime, sulphur and salt mixture. It would be well to write the State Entomologist, or the Entomologist at Cornell University or the State Experiment Station at Geneva for the latest information.

Curculio.—See Cherry.

San José Scale.—See Apple.

Fungi.

Crown Gall.—Produces hard, roundish knots near the crown or on the roots, sometimes on the lower part of the trunk. Discard affected trees when planting, remove knots when found and paint over the cut surface. This is probably the same fungi which appears on the plum, apple, blackberry and raspberry. No satisfactory treatment seems to have been devised for it.

Leaf Curl.—This causes the leaves early in the spring to become curled, knotted and swollen and often covered with a grayish bloom. In April, as soon as the buds begin to swell, spray the trees thoroughly with Bordeaux. In very wet seasons make a second application with dilute Bordeaux just after the petals fall.

Scab.—This shows in a roundish, dark brown spot on the fruit, "shotholes" in the foliage and discolored areas on the young twigs. Give both sprayings as for leaf curl, following with one or two treatments with potassium sulphide upon the half-grown fruit.

Brown Rot.—In some sections of New York this causes most serious injury to fruit, rotting it at about the time of maturity. It also occurs on young twigs. The rotten areas usually become covered with numerous pustules of dusty brownish spores. Eventually the diseased fruits form hard mummies. Give both sprayings as for leaf curl, another with dilute Bordeaux after the fruit sets, and two with potassium sulphide as the fruit begins to ripen. During the season pick and destroy all rotten fruit as often as possible, and in the fall destroy all mummies found on the trees and ground. This same fungus occurs on cherries and plums, and occasionally on pears and apples.

Yellows.—This well-known disease causes premature ripening of fruit and forms sickly yellowish growths from the buds of trunks. It is evidently a contagious but not a fungous disease. All diseased trees as soon as noticed should be rooted out and burned.

PEAR.

Insects.

Psylla.—This insect sucks the sap from the twigs. Spray with kerosene emulsion just after the leaves have expanded to kill the young. If necessary repeat in midsummer, just after heavy rains.

San José Scale.—See Apple.

Scurfy Bark Louse.—See Apple.

Fall Web Worm.—This insect forms its nests on the branches in August and devours the foliage. Spray with Paris green or arsenate of lead. Remove the nests while small.

Fungi.

Pear Blight.—This is the most serious fungi with which pear growers have to contend and is still little understood. It kills the young twigs and even the large branches, and sometimes the entire tree. The leaves suddenly turn black and shrivel up. It is a bacterial disease, and is probably spread by bees during the blossoming period. Winter prune all diseased branches, cutting off well below the diseased area. Through the summer all dead twigs should be removed in the same way. The knife or saw should be sterilized after each sawing by wiping with a cloth saturated with carbolic acid. This disease is also found on the apple and quince.

Leaf Blight.—This forms round, reddish-brown spots with central black dots on leaves and fruit, the former often shedding prematurely and the latter cracking irregularly. Spray with Bordeaux just before the blossoms open, again soon after they fall, and follow with one to four additional treatments at intervals of ten days, according to the weather.

Leaf Spot.—Forms on the leaves in angular whitish spots, usually with minute black dots in their center. Spray with Bordeaux on unfolding leaves before blossoms open, again after blossoms fall, and give a third spraying two weeks later.

Scab.—This develops olive-black, scabby spots on the leaves and fruit, often causing the former to become distorted and cracked. The fungus probably lives over winter on the twigs. Spray with Bordeaux as recommended for apple scab.

Some of the most effective work which has been done with Bordeaux has been done on pears. We know of a small block of White Doyenne which had not produced a marketable pear in ten years before it was sprayed, and after two seasons spraying hardly a scabby specimen is to be found.

PLUM.

Insects.

Curculio.—See Cherry.

Fruit Bark Beetle.—See Peach.

Plum Scale.—A large, brown scale to be found on the twigs, sucking the sap. Spray with soap or kerosene emulsion.

San José Scale.—See Apple.

Aphis.—See Cherry.

Fungi.

Black Knot.—See Cherry.

Brown Rot.—See Peach.

Crown Gall.—See Peach.

Leaf Curl and Plum Pocket.—Whether these are two separate fungi or different forms of the same one is disputed. They cause the young fruit to become irregular and produce distortions on it, the branches and leaves. They seem to be similar to peach curl, and could probably be combated by the same treatment.

POTATO.

Insects.

Colorado Beetle.—Adults and larva devour the leaves. Apply Paris green or arsenate of lead. These can be used in Bordeaux mixture.

Flea Beetle.—Adults eat the leaves. Use Bordeaux mixture containing some of the arsenical poisons.

Stalk Weevil.—Burrows inside the stalk. Infested vines should be burned.

Fungi.

Blight or Downy Mildew.—A sudden blackening of the leaves and often death of the vines is shown during July and August. There is usually a frost-like growth of fungus on the under side of the leaves. Spray with Bordeaux before the trouble appears, about the first of July, and keep the vines well covered, especially from the middle of July to the middle of August. Unless the season is very moist three sprayings should suffice. In spraying for this difficulty some of the arsenical poisons should be added to control the bugs and flea beetle.

Scab.—This difficulty manifests itself in the scabby appearance on the surface of the tubers. The seed tubers should be soaked for two hours in dilute formalin. Care should be exercised not to plant potatoes on soil which has produced scabby tubers. It is probable that the scab fungus lives on some roots which may carry it over in the ground. The same trouble occurs on beets and turnips.

QUINCE.

Insects.

Borer.—See Apple.

Curculio.—See Cherry.

Fungi.

Black Rot.—The fruit, often beginning at the blossom end, decays. The twigs and branches are also killed. In the fall or spring cut off and burn all dead branches. Before the buds swell spray with Bordeaux. This is another difficulty which is being investigated by our horticulturists, and those having trouble with it are recommended to write to Cornell University or the State Experiment Station for further information.

Leaf Blight.—See Pear.

Rust.—Treat the same as for apple rust.

RASPBERRY.

Insects.

Cane Borer.—Cut and burn infested canes.

Fungi.

Anthracnose.—On raspberry this forms more or less confluent whitish spots with purplish borders on the stems. Early in the spring, before the buds swell, cut out and burn all infected canes. Spray the others with Bordeaux. If the disease still shows itself, spray again when the young shoots are about six inches high, and repeat in ten to fourteen days. Aim to cover chiefly the young shoots with the spray. As soon as the fruit is gathered remove all badly infected canes.

Cane Blight.—This manifests itself in superficial reddish discolorations, beginning at the base of the petioles and gradually spreading over canes, with more or less curled leaves having a yellowish tint. This is a very serious difficulty with some varieties of red raspberries, but seems to have had but little attention paid to it. It is safe to recommend the same treatment as for anthracnose.

Crown Gall.—See Peach.

Leaf Spot and Rust.—See Blackberry.

ROSE.

Insects.

Aphis or Green Fly.—This insect is very troublesome, sucking the sap from the new shoots, leaves and stems. Spray thoroughly with soap or kerosene emulsion as often as the insect appears.

Leaf Hopper.—Sucks the sap from the under side of the leaves. Spray with soap or kerosene emulsion as often as it appears.

Slug and Canker Worm.—These eat away the green portion of the leaves. Spray with hellebore or kerosene emulsion.

Fungi.

Leaf Blotch.—This shows in large purplish black blotches on the leaves, which often turn yellow and fall off. For greenhouse treatment paint hot water pipes with mixture of sulphur and oil; potassium sulphide or ammonia solution copper carbonate can be sprayed on the foliage. Spraying out of doors can be done with Bordeaux, if there is no objection to the sediment on the leaves.

Mildew.—A powdery white or cobweb-like growth on the young leaves, which become more or less distorted and fall off. Treat the same as for leaf blotch.

SQUASH AND PUMPKIN.

Insects.

Squash Borer.—Tunnels in the base of the stem, causing decay Cover the base of the vines with earth so that new roots may be formed to support the plant. Grow a few early plants for traps and destroy them. The main plants should be planted rather late.

Squash Bug.—This insect is a grayish brown in color, between half and three-quarters of an inch in length. Quite a ready flyer, with rather weak legs. It is commonly called the "stink-bug," because of its peculiarly offensive odor. Only two broods occur in New York State, though they overlap somewhat, making it seem as if its breeding occurred during the entire summer and early fall. The punctures made by this insect in feeding seem to have a poisonous effect on the plant, young vines especially being apt to succumb to even a few specimens. The second brood does not mature until quite late in the fall, and those which become adult after the first of September are the ones which go into winter quarters. It should be the object of every grower to destroy all vines of the *cucurbit* family just as soon as the crop is gathered, so that the immature bugs will starve and not develop into adults. Hand-picking or catching in shingles, which have been laid down for traps, is a most satisfactory way of keeping them down. The eggs are laid on the under side of the leaves, and are so prominent that they are readily found and can be destroyed.

STRAWBERRY.

Insects.

Crown Borer.—Grubs feed in the crown of the plant. No satisfactory method of spraying. Plant on new land, burn over infested fields in the fall and practice crop rotation.

Fungi.

Leaf Spot and Blight.—These have conspicuous spots with whitish centers and purplish borders. Spraying with Bordeaux is efficient, once before blossoming and twice after the fruit season is over. If a field is badly infected, plowing and burning over will be profitable.

TOMATO.

Insects.

Tomato Worm.—A large caterpillar which destroys the leaves. Spray young plants with Paris green or arsenate of lead. On fruiting plants, hand-picking is the only safe remedy.

White Fly.—In some sections this does serious damage, working on the under side of the leaves, sucking the sap. Spray with soap and water, or before the fruit develops with kerosene emulsion.

Fungi.

Leaf Spot and Blight.—Produces on the leaves and stems numerous small dark spots, often with white centers. The fruit often begins to decay and turn black at the blossom end, spreading over the entire fruit and causing it to rot before it ripens. Begin spraying with Bordeaux about two or three weeks after transplanting, following up after intervals of about two weeks.

WHEAT.

Insects.

Chinch Bug.—Sucks the sap from the leaves. Spray with kerosene emulsion or soap and water. Burn over all infested land in the fall, winter or spring to kill the hibernating bugs.

Instruction in Agriculture in Cornell University.

The College of Agriculture is one of several coördinate colleges comprising Cornell University. The courses of instruction are of three kinds: 1. The four-years' course; 2. The special course, with a maximum of two years; 3. The winter course of eleven weeks. Aside from these, opportunity is offered for pursuing advanced or post-graduate work.

I. ADMISSION TO THE FOUR-YEARS' COURSE LEADING TO THE DEGREE OF BACHELOR OF THE SCIENCE OF AGRICULTURE.

A. General Conditions of Admission.

Candidates must be at least *sixteen* years of age, or, if women, *seventeen*. They must have certificates of good moral character, and students from other colleges or universities are required to furnish from those institutions certificates of honorable dismissal.

Candidates for admission must file their credentials and obtain permits for examination at the Registrar's office. The results of examinations may be ascertained from the Registrar.

The following subjects are required for admission: English, Physiology and Hygiene, History [the student must offer two of the four following divisions in history (a) American, (b) English, (c) Grecian, (d) Roman], Plane Geometry, Elementary Algebra and either A, B, or C, as below:

A. Greek and Latin.

B. Latin and either Advanced French or Advanced German.

C. Advanced French, Advanced German and Advanced Mathematics.

An equivalent of any one of the three groups, A, B and C, may be offered, provided five counts are offered. Latin counts 3, Greek, French and German 2 each. Advanced Mathematics (Solid Geometry, Advanced Algebra, Plane and Spherical Trigonometry) 1, provided, however, that the student before graduation must have passed in one modern language and in Advanced Mathematics if they were not offered for entrance.

An alternate requirement instead of Advanced Mathematics may be offered in Physics, Chemistry, Botany, Geology and Zoölogy.

For details as to subjects and methods of admission see University Register for current year, pages 33-72.

For admission to the freshman class communication should be addressed to the Registrar. See University Register, pages 33-52.

For admission to advanced standing from other colleges and universities all communications should be addressed to the Director of the College of Agriculture. See University Register for current year, pages 52-53.

For admission to graduate work and candidacy for advanced degrees, communications should be addressed to the Dean of the University Faculty. See University Register for current year, pages 64-72.

B. ADMISSION WITHOUT EXAMINATION.

1. On Regents' Credentials.

Diplomas and sixty-count academic certificates issued by the Regents of the University of the State of New York are accepted in the place of examination in all the subjects required for entrance which are covered by such credentials, including upon the recommendation of the University departments concerned, the subjects of French and German, Physics, Chemistry, Botany, Geology and Zoology. A statement from the teacher giving in detail the work done and the proficiency attained in these subjects must be submitted by the holder of the diploma.

Certificates and pass cards issued by the Regents are not accepted unless they are presented by the holder of a Regents' diploma or sixty-count academic certificate.

To secure exemption from the entrance examination in English the Regents' diploma or sixty-count academic certificate must cover first year English, second year English, and *either* third year English or English Reading.

Application for credit in all subjects for which credit is desired, must be made at the time of the admission of the applicant, and not be postponed to any later date in his course.

Diplomas, certificates and statements should be sent by mail to the Registrar before the opening of the term.

2. ON SCHOOL CERTIFICATES.

The following rules and regulations have been adopted by the Faculty of Cornell University on the subject of admission by certificate:

1. Certificates of work done in public or private schools, in or out of the State will not be accepted in lieu of examinations, unless the applicant has completed a full course in the school, and has been duly graduated after at least one year in the school, and the University authorities are satisfied regarding the standing of the school.

2. The application for the admission of a student by certificate must be made by the principal of the school and not by the candidate himself.

3. The application from the principal must be accompanied by full and specific information with regard to the completeness and thoroughness of the studies and course in which instruction is given. In case a catalogue or circular is published, a copy thereof should also be furnished.

4. Admission by certificate is in all cases provisional. If a student fail in any subject in the University that depends upon an entrance subject for which a certificate has been accepted, the credit for that entrance subject may be cancelled. Certificates from schools whose students prove to be imperfectly fitted will ultimately not be considered.

5. Subjects in which an examination has been passed for admission to the school, may be included in the certificate, but in all cases the full information called for by the blank should be given.

6. *No school certificate will be accepted in place of entrance examination in English.*

7. The committee having charge of the acceptance of certificates may meet at any time during the collegiate year, but the certificates should be forwarded as soon after the graduation of the student as is possible, and at least as early as the first of September.

8. The University does not engage in advance to accept the certificates of any school, and the previous acceptance of such certificates merely raises the presumption that similar certificates may be accepted again, but does not establish a permanent right to such acceptance.

Application for credit in all subjects for which credit is desired must be made at the time of the admission of the applicant, and not be postponed to any later date in his course.

All communications on this subject and all certificates must be addressed to the Registrar, from whom also blank forms for certificates may be obtained.

3. ON THE CERTIFICATES OF THE COLLEGE ENTRANCE EXAMINATION BOARD.

The certificates issued as the result of the examinations to be held in June by the College Examination Board of the Middle States and Maryland will be accepted under the same conditions as if such examinations were held by this University.

For further particulars address Secretary of College Entrance Examination Board, Sub-station No. 84, New York City.

C. ADMISSION ON EXAMINATION.

Examinations in all the subjects required for admission to the University are held *at Ithaca* in September, at the beginning of the first term.

The certificates issued as the result of the examinations to be held in June by the College Examination Board of the Middle States and Maryland will be accepted under the same conditions as if such examinations were held by this University. For further particulars address Secretary of College Entrance Examination Board, Sub-station No. 84, New York City.

No examination of candidates for admission will be held at any other times or places. Further information in regard to the time of examinations in September may be found in calendar. Specimen copies of examination papers will be sent on application to the Registrar.

II. THE SPECIAL COURSE.

The Special Course is intended for young persons who cannot well spend four years in preparing themselves to become farmers and who yet wish to avail themselves of technical and practical instruction in modern scientific agriculture.

Persons who are eighteen years of age and who furnish evidence to the Director that they are able to pursue the work elected in a satisfactory manner, are admitted to the Special Course without examination upon recommendation of the Director of the College. The number of hours and the courses elected must be approved by the Director. This course may extend through either one or two years.

Special students, during the time they are in the University, enjoy equal advantages in all respects with students who are studying for a degree. They receive instruction in the same classes as the regular or four-year students, but their work is more concentrated in those subjects that have a direct bearing upon practical agriculture. Applications for admission to the Special Course should be made personally or by letter to the Director.

III. THE WINTER-COURSES IN AGRICULTURE AND DAIRY INDUSTRY.

There are many persons who cannot spend two or more years at college, but who would receive great benefit from lectures and practice during the winter months. To meet the needs of such persons the Winter-Course in Agriculture and the Winter Dairy-Course are offered. They begin the first week in January of each year and extend through eleven weeks.

Persons who are of good moral character and seventeen years of age may be admitted by the Director of the College without a formal examination, but are required to file a letter of recommendation and to satisfy the Director that their previous training has been such that they can pursue the studies elected with profit to themselves and credit to the University.

Make application to join above courses, and for an announcement, early — since but a limited number of students can be received because of insufficient space in class rooms and laboratories.

IV. ADVANCED OR GRADUATE WORK IN AGRICULTURAL SCIENCE.

The advanced instruction is designed to fit men for teachers and experimenters, and it may lead to the degrees of Master of Science in Agriculture, and to Doctor of Philosophy. The laboratories, dairy building, farm gardens, orchards and libraries give ample facilities for the prosecution of independent work of a high character.

A yearly fellowship of an annual value of $500 is assigned to the following group of departments: Agriculture, Horticulture and Veterinary Science. *See University Register for current year, page* 65.

FEES AND EXPENSES.

Tuition is free to students pursuing the prescribed course in *Agriculture, and intending to complete* that course; and to *special and graduate students in agriculture* taking at least two-thirds of their entire work in the departments of agriculture, horticulture, and in the courses in agricultural chemistry and economic entomology. Winter-Course students not residing in New York State are charged tuition.

A fee of $5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree. This fee must be paid at least ten days before Commencement.

The fee charged for an advanced degree is $10, and it must in all cases be paid at least ten days before Commencement.

Deposits are required in the various laboratories where work is taken, ranging from $1.50 to $10 per term, according to the amount and nature of the work.

The expense of living in Ithaca varies from $3.50 to $5 per week for board and lodging.

For further particulars address L. H. Bailey, Director of the College of Agriculture, Cornell University, Ithaca, N. Y. The Register of Cornell University contains further information; this may be had on applying to the Registrar, Ithaca. A separate catalogue of the College of Agriculture may be had on application to the Director.

What Shall the Farmer Read?

By F. H. Hall.

Millet, in his "Man with the Hoe," has painted a farmer who does not read; and Markham in his poem has voiced the condition of this luckless creature. He stands before us, in both picture and poem, a thing little better than the beasts—a mere machine to whom Nature's "sermons in stones, books in running brooks and good in everything" do not appeal, and from whom have gone, if ever he possessed them, both desire and ability to gather instruction or pleasure from the stored thoughts of other minds.

Even Hawthorne tells us: "The yeoman and the scholar, the tiller of the soil possessing the sturdiest sense, integrity and honor, and the man of finest intellectual culture are and must remain two distinct beings." But we hold to-day that Millet's painting and Markham's poem typify exceptional conditions. They may refer to the farmer of some by-gone time, or in some benighted country where even women are made beasts of burden and plowmates of horse or dog, but they do not apply to the modern American husbandman. Hawthorne could have been referred to many examples to refute his statement: to Virgil, a farmer; to Burns at the plowtail, composing songs which have stirred the heart universal; to Whittier in the hayfield, moved to thoughts which rang in freedom to the slave; to Thoreau in his little bean-patch, finding nature-pictures that please; to Webster, to Lincoln, to Garfield, who, in their humble farm homes, found time to cultivate the taste for books which all their hard farm labor could not quench.

The American farmer of these opening years of the twentieth century is not an illiterate, uncultured boor. He cannot be and succeed. He meets life at too many points where knowledge gained from wider experience than his own must come to his aid. The old distrust of "book farming" is rapidly passing; and the progressive herdsman or gardener or orchardist finds practical guidance in books dealing with the technical side of his craft; while, with all humanity, he may reason with the philosopher, laugh with the humorist, thrill at the vivid pictures of the novelist, sigh with the poet or feel his aspirations raised to heaven in accord with the preacher's words, as the thoughts of these intellectual masters become his own through the lines of the printed page.

So we might dismiss the question, "What shall the farmer read?" by saying that he should, and can, and will, and does read and understand and appreciate any book which is worthy the thought of other men.

But "of making of books there is no end;" so, appalled by the mass, many farmers and their families neglect all books; or without careful thought of selection, take up whatever comes to hand and read much that is without profit, neglect much that is most valuable.

He who fails to read good books misses a part of life that nothing else can replace. Says Channing: "God be thanked for books. They are the voices of the distant and the dead, and make us heirs of the spiritual life of past ages. They give to all who will faithfully use them the society, the spiritual presence of the best and greatest of our race. If the writers will enter and take up their abode under my roof * * * I may become a cultivated man though excluded from what is called the 'best society' in the place where I live."

Books keep fresh for us the beauties of nature. We may stroll through the leafy grove in summer and breathe in the fragrance of its woodey perfumes; we may study and rejoice in the life of flower or butterfly or bird; we may wander in the forest or beside the winding brook and experience the thrill of the hunter, the manifold delights of the angler; but when winter's long evenings come, the pleasures of summer cannot all be recalled even by the aid of memory's magic. Then step to the book-case. Through Burrough's eyes we may see again the wildwood in all its freshness and find, by his keener vision, relations of nature's forces we have hardly dreamed of. With Thompson-Seton's sympathy let us recall and supplement our acquaintance with the partridge and the fox and learn the daily life of pretty, shy Molly Cottontail or thievish Silver Spot, the crow. With Van Dyke we may wade again the trout stream and in revery feel our hearts lifted through nature up to nature's God.

Their words, once on our library shelves are at our instant call, and the pictures they paint, brightened by tints of our own imagining shall bring back the joys of summer with doubled power to please.

Books aid religious life. We may sit beneath the teachings of most eloquent, most learned, most sincerely Christian ministers; yet a few moments upon some quiet Sunday afternoon with Beecher, or Spurgeon, or Moody, or Hillis, may rouse the sluggish spirit as the sermon of the morning failed to do.

Books widen our personal experience. We may, perhaps, see in some companion's life sadness and joy, mishaps and good fortune, plot and counterplot as thrilling as any in the drama; yet a volume of Shakespeare will open before us more lines of human interest than any one life can feel or see.

Our families and friends may be witty and wise, their personalities varied, their character development well worth our study, their conversation, their love affairs, their work, of intense interest to us; yet these are not unfailing. Family, neighbors, friends, ofttimes seem commonplace and prosy. Then the knights and ladies of Scott, the droll cockneys or harsh pedants of Dickens, the romantic adventures of the *Three Guardsmen*, the subtler character drawing and society plots of the modern novelist or the shrewd keenness of a *David Harum* or *Eben Holden*, may afford most opportune entertainment.

When life seems devoid of pleasure, a humdrum existence, a barren waste, turn to the poets and by their beautiful descriptions of every-day scenes, by their songs of love and longing, by the harmonious combination of sweet sounds which charm the ear, the sense of beauty will be wakened from sleep, and life and living will again seem worth while.

And even though our farms be yielding bountifully and our cows send home pails brimming with richest milk, we will find interest and profit in the practical advice of Roberts or Bailey or Jordan.

Yet, fill our shelves ever so full of the most powerful books of the best minds, their words never intrude where they are not invited. They are our servants, ready at an instant's notice to yield to us their stores of wisdom, advice, entertainment or fun; to thrill our lives with romance or to charm them with beauty; to call up the brave and wonderful deeds of the past; to point out lines of promise for the future; to urge us to our duty in the present. They are equally ready to bear unrepiningly our neglect for years, until fitful impulse or sincere desire again sends forth the hand to take them from their quiet nooks.

From what friend could we ask so much? Even the creators of these very books we dare to treat so slightingly would not have borne such neglect from boon companion or dearest friend.

"A good book is the precious life-blood of a master spirit, embalmed and treasured up on purpose to a life beyond life." These pure essences, the best thoughts of the best minds of all the ages, are ours to quaff, unclouded by the dregs of personal disfigurement, morose temper or moral failing which may have marred the personality of the thinker. We can read Carlyle in personal freedom from his caustic tongue, and the other consequences of indigestion which he vented upon wife and companions; Pope's verses please without offending as could no lifelong intimacy with the peevish little hunchback; the ponderous sentences of Johnson come to us from the printed page without awakening disgust at his gluttony and epilepsy; Thoreau's taciturnity or Kipling's reserve cannot prevent our enjoying, without fear, the rich stores of their observation and fancy.

Surrounded by good books we may attain a culture reached by others at great expense by association with the leading living minds of the world, by travel at home or abroad, or by a thorough course of study at some great university. These things are possible to but few, but good books are attainable by all. Do not say, "We cannot afford books." You cannot afford *not* to have books. Ruskin says: "How much do you think we spend altogether upon our libraries as compared with what we spend on our horses? If a man spends lavishly on his library you call him mad—a bibliomaniac. But you never call one a 'horse-maniac,' though men ruin themselves every day by their horses, and you do not hear of people ruining themselves by their books. Or, to go lower still, how much do you think the contents of the book shelves of the United Kingdom, public and private, would fetch as compared with the contents of its wine cellars? What position would its expenditure on literature take as compared with its expenditure for luxurious eating? We talk of food for the mind as of food for the body; now, a good book contains such food inexhaustibly; it is provision for life and for the best part of us; yet how long most people would look at the best book before they would give the price of a large turbot for it? Books are cheaper now than when Ruskin wrote, and the wastes of a week in many a household, the price of an extra large Thanksgiving turkey or the money burned in a few cigars, would purchase entertainment for many winter evenings. Let every home have books; a modest collection if the means be small, but well selected and with something every member of the household can enjoy.

Beecher says: "No man has a right to bring up his children without surrounding them with books. It is a wrong to his family. He cheats them. Children learn to read by being in the presence of books. The love of knowledge comes with reading, and grows upon it, and the love of knowledge in a young mind is almost a warrant against the inferior excitement of passions and vices. A little library, growing larger every year, is an honorable part of a young man's history. It is a man's duty to have books. A library is not a luxury, but one of the necessities of life."

Were more country homes supplied with interesting reading, there would be less occasion to raise the question, "How shall we keep the boys on the farm?" Even one good magazine or paper like the *Youth's Companion* coming regularly into the house will be a tie most boys will consider before leaving the home nest. The occasional coming of a new book like Thompson-Seton's *Wild Animals I Have Known*, or Bailey's *Lessons with Plants*, or Gibson's *Sharp Eyes* will waken the wits of boys or girls, if they have any, and inspire a love for country life that it will take many city attractions to overcome. A good story by Castlemon or Alger or Henty, while not of the highest literary merit, will teach good morals and develop respect for courage and pluck. They can do the sensible boy no harm, and their charm will fill him with disgust for the low pleasures of the corner grocery, billiard room or saloon. *The Man from Glengarry* cannot help but appeal with power to the manly qualities of any country youth.

The farmer needs books which treat of the farm. The days have long since passed when he could turn over the rich soil, and, weather permitting, reap a bountiful crop without opposition from insects or disease. He can no longer send his cattle into the rich meadows or hill pastures, toss them a generous supply of easily raised corn and corn stalks at stabling time, and make a profit on the resulting milk and beef. Soils have lessened in fertility, enemies have come to grain and fruit, competition forbids wastefulness of every kind if cultivation and feeding are to bring profits. In the old days a good, vigorous body, working faithfully along well-known, broad lines, was all that was needed to earn Nature's bounty; and the near field supplied the near market. Now the farmer who depends on strength alone and treads the path his father trod, must go to the wall. He must know something of the principles which underlie soil fertility, must be on the alert to meet the enemies of his crops, must make each animal do the best possible on a minimum expenditure for food, must make his product fit to compete with the best in the world, he must market right, he must buy right.

To keep posted on these things books and papers are essential. Fortunately the past ten years have added a vast fund of interesting and valuable literature in the realms of practical agriculture and horticulture. Roberts' *Fertility of the Land,* King's *The Soil,* Voorhees' or Bailey's *Principles of Agriculture,* Wing's *Milk and Its Products,* Farrington and Noll's *Milk Testing,* Henry's *Feeds and Feeding,* Jordan's *Feeding of Animals,* Adams' *Modern Farmer,* Myrick's *How to Cooperate,* Lodeman's *Spraying of Plants,* Johnson's *Fumigation Methods,* Weed's *Insecticides and Fungicides,* Sanderson's *Insects Injurious to Staple Crops,* Bailey's *Principles of Fruit Growing* and the *Garden Craft Series* under his editorship, including books on plant breeding, the nursery, pruning, plant forcing, and garden making, Taft's *Greenhouse Construction* and *Greenhouse Management,* Maynard's *Horticulture,* Card's *Bush Fruits,* and many other books on particular features of farming and gardening are up-to-date, written in popular, plain language, concise and practical. In most of these books we can trace plainly the influence of the experiment stations, a feature which separates and puts them above the good, old stand-bys of twenty years ago, like Allen's *Book of the Farm,* Sheldon's *Dairy Farming,* Henderson's *Gardening for Profit,* Stewart's *Feeding Animals,* and others not to be sneered at or passed over in silence. They are simply laid aside until they can be revised and completed in the light of modern experience.

The progressive farmer will not neglect his file of station bulletins, for if he does he will miss some point by which his neighbor will profit. Of course these are often dull and tedious when they deal with matters of no immediate interest to you; but they cost you nothing, and when they are applicable to your conditions their word is of value. See that you keep complete files of the bulletins of your own stations; and when your favorite farm paper speaks of a publication of interest from some other station, write a courteous request for it to the director of that station. You will be almost certain to get it if it is to be had at all. In like manner keep track of the publications of the United States Department of Agriculture; for their work of late years is careful, thorough, and often of great value. The Department will, if you request it, send each month a list of its publications published that month. Many of these bulletins and reports are free and the others cost but a few cents apiece. Your Congressman or Senator can usually secure these for you without expense. You, of course, need a good farm paper; and so many good ones are published in this State that you can hardly miss in your selection. *Country Gentleman, Rural New Yorker, American Agriculturist, New York Farmer, New York Tribune Farmer*, each is good in its chosen field and style. From outside the State come the *Breeder's Gazette, National Stockman, Hoard's Dairyman*, and a host of others of greater or less value and applicability.

Books for the children, then, and practical guides to thorough understanding of the farm and its operations, are absolutely essential, but the library should contain more than these. The farmer of to-day, with milk to carry to creamery, cheese-factory or shipping station in the morning, and herd to look after in the evening; with feed and fertilizers to haul from market; with poisons and preventives to mix and to apply for bugs and blights; with Grange meetings and farmer's clubs to attend, may not have the leisure his father had forty years ago, who fed his horses in the morning, plowed with them until the sun was low, gave them their corn or oats, milked the cows and counted it a full day's work. Yet when you have attended to the few little details of modern farming, have eaten and drunk and smoked, fed and watered and carefully groomed both horses and cows, plowed and harrowed, and sowed, and sprayed, and cultivated, and harvested, and threshed your crops, bought new tools and fixed up old ones, repaired the fences and buildings, got up the winter's supply of wood, looked after the highways and schools and preachers and widows and orphans and paupers; when your good wife has cooked and baked, and stewed and fried, washed dishes, swept, scrubbed, mopped, dusted, washed, ironed, mended, darned, sewed, knit, watered the plants, fed the canary, spanked the children, fretted, scolded, visited, still you will both have some time for reading. Winter evenings are long and Sunday afternoons are quiet. "What shall you read?" As easy to answer as "How long is a piece of string?" or "How big is a lump of sugar?"

Some books, though, can be commended for all, some neglected, some rejected.

First. You will surely read the Bible. Even if you may not believe all its teachings — which seems too sadly true in many rural districts — you will find within its covers the best guide to morality the world knows; history which has influenced civilization as that told in no other volume; biography for warning, for example, for inspiration; poetry as beautiful, as majestic, as heart-thrilling as any in profane literature, all expressed in "pure English, undefiled," a model of correctness and strength.

Next comes a book appearing in many editions, revised and corrected by many authors; a book of short stories, some thrilling, some prosy, but all true and all suggestive, the dictionary of the English language. Without this book and its companions, the atlas and the encyclopedia, at hand and consulted faithfully, you may miss the best of other books you read.

You will require some good newspaper, but you must learn to read it properly, to know at a glance gossip to skip, sensationalism to be discounted or topic of local or world-wide interest to be studied with all the earnestness you have. The magazines, also, demand a place. Through them we get the best thoughts of our living thinkers in every line of human activity; in them we see through the eyes of witnesses, events which are shaping history; they offer us the best stories by the brightest pens; and reproduce for us, by the engraver's art, the distant scenes we may not visit, the magnificent conceptions of the great masters in art, and the pictured thought of novelist or poet.

This is literature for information; you must also read for general culture. Read works which broaden your horizon, which deepen your intelligence, which arouse in you more sincere interest in society and politics, which quicken your sensibilities, which cultivate your artistic tastes, which develop your moral fiber.

History is to most of us only a school study, for we find time to get little beyond a general knowledge of the events which have marked the advance of civilization; a mere sketch of the nations of antiquity, a little broader acquaintance with the literature and art of Greece, with the principles of warfare and the legislation of the Romans, a hasty glance at the Middle Ages and the Crusades, a little keener scrutiny of the development of England bearing so closely on our own, and probably a very fair idea of men, events and principles marking the rise of our own glorious Republic to the foremost place among the nations of the world. Based on this broad foundation, which each should have or should exert himself to secure, we can never read too widely in history. As we become more and more familiar with the interplay of forces, note the principles and practices which have uplifted or cast down leaders and kingdoms, see how some obscure man or some apparently trivial event has changed the course of nations, we not only become broader ourselves, but we realize more clearly how thoroughly interwoven are the interests of the individual with the interests of humanity. Most intimately connected with history is biography, for the life and progress of a nation can often be told in the lives of a few of its leaders in thought and action. Such lives have more personal interest than the pages of history, and we find in the perusal of their record that which instructs and inspires us. No American can be his best until he has read and imbibed the life stories of Washington, Ethan Allen, Benjamin Franklin, Lincoln, Webster, and their noted compatriots, one or all.

History, though, and biography, do not show us the heart of the world. They are too formal, we might almost say, too philosophical, to picture the real life with its events which move from day to day rather than from year to year, or age to age. To get these we must read the literature of the drama or the novel; whose characters move, love, hate, plot, prosper, or die in our minds as really as though they were our companions.

From the pages of *Ivanhoe* we get more vivid ideas of the life and manners and conditions of that age than from the volumes of Macaulay. In Shakespeare's *Caesar* we see a more real emperor, feel the power of his mind, realize the vastness of his triumphs, understand the fear and envy he aroused, learn more of the motives which moved the Roman mind than in any formal relation of his deeds and experiences. In *Hugh Wynne* or *Janice Meredith* or the *Seats of the Mighty,* clearer pictures of our country's early conflicts are fixed upon our minds than from the pages of Bancroft or Ridpath. Mrs. Stowe's *Uncle Tom's Cabin* showed the North the wrongs of the negro as could no calm discussion of the ethics of slavery.

In thus supplementing history, fiction and the drama do not exhaust their value. This is greatest in their influence on the spirit and character of the reader. He must be a better man who has known *John Halifax;* a more courteous gentleman, he who has admired *Colonel Carter of Cartersville;* he will become less fretful under petty cares who recalls *Mark Tapley's* merry laugh or *Colonel Seller's* optimism; he will less easily succumb to difficulties who has followed the career of *The Honorable Peter Stirling.* That woman will have a broader and a purer mind, a sweeter spirit, more of sympathy, less of harshness, who has lived, mentally, with *Agnes Copperfield,* Adam Bede's *Dinah,* Jennie Dean's *Babbie, Meh Lady* or *Janice Meredith.*

As fiction makes familiar to us scenes from other times, makes real to us characters of robust worth, makes to live for us and in us sentiments of which our real lives may be bare, so poetry trains the imagination that it may clothe with beauty the humblest scenes. *The Cotter's Saturday Night* has changed the humble roof of many a lowly cottage to a thin division 'twixt the heaven above and its earthly counterpart — a loving, contented home. Says some one: "A single poem that warms the affections, elevates the soul, excites the imagination, kindles the emotions and arouses noble aspirations may be worth more to myriads of readers than a whole library of fact, argument, exhortation or edification."

If you have but a few good books among the thousands found among the classes I have named, the Bible with a good concordance and Bible dictionary, a few of the best, most uplifting religious books — do not depend on Baxter's *Saint's Rest*, Young's *Night Thoughts*, and a few other old stand-bys inherited from your good old grandmother — the dictionary, encyclopedia and atlas, a few of the modern, thought-compelling works on the farm and farming, bulletins, a good agricultural paper, a newspaper or two, a story paper, books of nature and an occasional romantic tale for the boys and girls, magazines, history, biography, travels, social science, Shakespeare, some of the best novels, and your favorite poets you will then have a selection no man need be ashamed of which will furnish aid and inspiration for all the household. Read them, think of them, add to them, and with the coming years you will find them a satisfaction far outweighing any sacrifice made to secure them.

What Can the Farmer Do?

By **Luella M. Wilcox.**

> "What if the little rain should say,
> 'So small a drop as I,
> Can ne'er refresh the drooping earth,
> I'll tarry in the sky.'"

When a new problem is to be faced, mortals in all walks of life are prone to think the suppositional thought of the raindrop and say: "Well, *I* can't do anything about it," or, "I don't see what can be done." Perhaps more than any other, is the farmer tempted to take a discouraged view of his work and think that his life is narrow and his opportunities limited. By his labor he is cut off from intercourse with his fellow man much of the time, and hard work and long hours leave him little inclination for recreation, either mental or physical. He has neighbors, but these live from a quarter to half a mile away, and are seen perhaps once or twice a month. He is often heard to say: "Well, it's the same thing year in and year out, over and over and over, hard work and nothing to show for it. I can't see the use of it all. We might as well give up."

Now is this disconsolate state necessary for the farmer? Is there not a better part which he can find all about him? As he looks out over the farm in November, that seemingly most dreary month of the year, what does he see? The trees are leafless; the grass and flowers are brown and dried; apparently everything is dead; but this is only a superficial view, he is looking only at the outside of things. As he looks more carefully at the trees he can see, on the tips and along the sides of the branches, the little buds which are wrapped snug and tight from winter's cold and are waiting patiently for spring.

When he carefully examines the dead grass he finds that down in the ground is a tiny bulb or root just as closely and carefully wrapped and protected from the cold as the buds on the trees. So will he find if he looks for the wild flowers in the wood; some are covered with blankets of leaves, while others have protection like the grass, and still others have sown their seed and so finished their work. Finally, a soft coverlid of snow is spread over them. Is November so dreary after all?

In the spring, when all these feel the warmth of the returning sun, the bright freshness of the spring air, and the moist breezes,—lo! as by a miracle, the waiting earth is transformed. The tender grass covers the hills and valleys, the buds burst forth, the flowers bloom, the birds return with their music, and the land is filled with brightness and beauty.

All this can the farmer see and feel, and can he refrain from saying to himself, "Whose hand hath done this?" As he sees the gradual development of his crops, "first the blade, then the ear, then the full corn in the ear," and finally gathers in the harvest, and then sees the preparation again for the repetition of it each year, he cannot help knowing that an intelligence and love higher than himself or the material universe, plans, directs and governs this wonderful panorama of nature in its regularity, order and beauty.

Nor are these the only witnesses. Who but the farmer can have such a glorious view of the heavens, as he sits in his homestead door of an evening and watches the stars in their courses without the obscuring gloom of houses and sky scrapers? And, in his heart he "knoweth who bringeth forth Mazaroth in his season and guideth Arcturus with his sons."

> "Alas! for him who never sees
> The stars shine through his cypress trees."

Surely, since "God's in His heaven, all's well with His world," and the farmer need not despair, but can rest safely in the thought that, even as the grass is clothed and fed and the stars directed in their courses, so will his Father feed, and clothe and direct him, and he can look out upon the world with a buoyant hope that all will be well.

In point of fact, never have the signs of the times been more hopeful for the farmer of America than now. Hear some of the things Secretary Wilson says in an article published in the *Youth's Companion* of February twenty-sixth.

"There are now at least ten different agencies for the education of the farmer in this country. Our system for investigating agricultural problems with the aid of science has developed marvelously in recent years. The boards of agriculture now organized in many of our States are sending out much useful information. No nation has ever had such a thorough system for improving its agriculture through scientific investigations. There has never been a time when there were so many good books on agriculture coming from the press as now. There are also more and better agricultural papers than ever before, and a vast number of agricultural societies are doing a great work in advancing the intelligence and business activity of our farmers. This winter, in the United States there will be held two thousand Farmer's Institutes which will be attended by three-quarters of a million of farmers seeking instruction."

He closes with this paragraph: "The farmer's life is exacting, but pleasant. He cannot afford to own fine paintings or statuary, but no artist can hope to place on canvas more than a faint likeness of what the farmer sees every day, or aspire to chisel from stone more than a resemblance of nature's groupings such as he beholds at every turn."

In a recent number of the *Saturday Evening Post* Senator Beveridge has this to say to young men, and it applies as much to the young farmer as to any other: "The point is that the young American finds himself in a country unrivalled in its world location; but also he finds himself surrounded by multitudinous resources so great that no mind has yet even grasped their immensity. These are his tools; these are his commission direct from nature itself appointing him the master craftsman in human affairs now and for some centuries to come. And it is these which command him to be as large and as *hopeful* and as conqueringly vigorous in his personal life as are the elements of greatness with which fortune has endowed his country. Optimism is too poor a word for what ought to be the attitude of the young American's mind."

In the face of such evidence the farmer of America can add to his faith, *hope*. And more than this, he can add that greatest of the three that abide, *charity*, or love for his neighbor. "What!" you ask, "for the neighbor whom he seldom sees?" Why, yes. He can at least think and speak kindly of him, even if he *never* sees him, and (one of the most practical ways of showing his love) he can at least keep the line fence in good repair.

Then, too, do you not think that by a little extra effort, a friendly visit once in a while would be possible, pleasant and profitable? If some of the old-time hospitality could be revived it would help to lighten and brighten the rugged ways of farm life to-day.

No man lives to himself alone, much less the farmer. He is a member of the community, the State, the nation, and must meet duties and responsibilities outside of himself and his farm. How can he, and will he meet them? With his bulwark of faith, hope and charity, he can bring to all obligations the same *fidelity* that he puts into his own work. If a duty comes to him he will not say, "Some one else ought to do this," or, "Another can do it better," but will say to himself, "This has come to me and so must be my work. I will do what I can;" and not content with thinking about it, he *does* it. He is a man of action rather than mere words, but does not fear to express his honest opinion when it is needed. He informs *himself* along political lines and casts his vote unafraid and with a clear conscience. No man tries to buy his vote or bribe him in any way, for all know that his honor and integrity are as dear to him as life—and to him life is not a joke, but a responsibility which he expects to bear himself. He is not afraid of doing more than his share, nor does he wait for others to start. He is alert, always ready, in public or private life; a man to be trusted, honored and loved.

This man the farmer *can be*, and the wonder is that he should ever desire to be anything less than such a *chief*.

What the Farmer's Wife Can Do.

By Mrs. C. C. Wells.

A Missouri schoolma'am, in reply to the question on examination: "Who is the greatest woman of history?" instead of answering, Cleopatra, Queen Victoria or Frances Willard, replied: "The Missouri farmer's wife of moderate means, who does her own housework, is cook, nurse, seamstress and manager of the poultry interests, is at the same time her husband's financial adviser and brings up a family of children, is the greatest woman of history." She was not alone in her appreciation of the requirements of the average farmer's wife.

It would seem that this was more than enough for the farm-wife, without adding to her burdens, and yet, all this may be faithfully done and life in the highest sense of the word be almost a failure, as so much depends upon the spirit in which our work is done. To quote an old couplet:

> "Not what we give but what we share,
> For the gift without the giver is bare."

If we are to labor in the right spirit we must have enthusiasm. Where shall we get it? In communion with nature and nature's god. We have all these years been so intensely busy with what we are pleased to call the practical side of life that we have had no time to stop and listen to the truths nature had for us; and it sometimes seems that the more zealous we women have been to grasp and save the almighty dollar, the more anxious have they seemed to slip away. So, let us pause and see if life on the farm has not something better for us than the pursuit of that elusive dollar. It is the farm-wife who must find the life more abundant and who must so train the farmers and farmer's wives of the future that farm life shall mean to them all that is noble and true.

The boys and girls have left the farm because it was so barren of beauty and sentiment. Scarcely a child can be found without a real love and longing for poetry, music or art; this is especially true of the boys. Time and again have I noted this in the country districts where there was little or no beauty or sentiment in the homes.

Nature's God, who has implanted this longing in the childish mind, has made ample provision for its full satisfaction; but there must be some one to allure into these paths that lead to a richer, fuller, life. We cannot, unless we ourselves have our eyes open to behold the beauty around us.

There can be no better time to open eyes and ears than the spring time. The robin's first song seems to tell us: "God's in His heaven, all's well with the world." A woman in her elegant city home was passing through great sorrow, having lost her child. Nothing would interest or comfort her, for she had wellnigh forgotten her Heavenly Father's love. She could scarcely eat or sleep, and her grief seemed to be crushing her very life; after several sleepless nights she began to notice in the early morning hours a cheery whistle. Morning after morning she heard it, always the same; and at last so curious she became about it that she mentioned it to her maid. O, said the girl, that is my father's message to me. When I first came here I was very lonely, for I had just lost my mother, and my father, who is night watch-man in a factory, told me that he would come this way and whistle a few bars and I would know they meant "Look up, cheer up, father loves his child." The sorrowing mother also received it as a message from her Heavenly Father and began to cheer up. If we are anxious or sad can we not accept as our Father's message the morning carol of the birds?

Country life offers to us the best opportunities of true culture of mind and heart. All that is best in literature may be ours if we will. Where could Whittier's *Snowbound* be so well understood and appreciated as around the sitting-room fire when the farmer's family have been kept at home from some entertainment by the drifting snow?

So much has lately been said in the farm papers concerning the naming of the farm that it hardly seems necessary to mention this as one of the means to accomplish the end sought. In some towns this seems to be one of the results of rural free mail delivery. During a recent drive through the neighboring town of Hamilton I was much interested in noting the names of the farms as displayed on the letter boxes by the roadside: Lake View, Applehurst, Homestead Farm, Willow Brook, Valley View, etc. Now I am inclined to think that these things are not merely matters of sentiment, but may be made to have a real moral and money value, as people try to live up to the name of their farm. Not one load of inferior produce would we allow to go from Meadowbrook Farm. The young people who lived at Elmwood would be almost sure to keep good company. The boy whose task it was to care for the Sunnyside garden would take pride in keeping it clean. The girl who claimed Rose Lawn as her home (if the home corresponded with the name) would not be ready to marry the first rascal that came along. City customers would be quick to believe that honey from Cloverdale Farm was of better flavor, and that berries from Brierdale were fresher than any others. Shakespeare must have been in his dotage when he wrote:

> "What's in a name? that which we call a rose,
> By any other name would smell as sweet."

We all know it would not.

Mothers, it means much to you whether the young people rush off to the cities to become clerks, teachers, etc., and perhaps drift with the tide that leads to moral ruin, or whether they remain on the farm, sharing your cares and cheering your declining years; but rest assured they will not share your cares unless you lead them to find their pleasures at your side. Your's is the privilege of opening their eyes to the beauties in nature and literature. Yours it is to lead in the movement that will provide them with a beautiful home in the highest sense of the word. Vines, shrubbery and rose-bushes cost but little, and the young people will gladly do the work under father's direction (for I know he will want a share in this). Isn't it worth while to take time for this work? You would think so if you knew it meant the salvation of your boy.

> "We shape ourselves the joy and fear
> With which our coming life is made,
> And fill our future atmosphere
> With sunshine or with shade."

The Farmer's Flower Garden.

By Nettie Burroughs Stout.

This title brings up various recollections and visions, some of which are of the burdock patches behind or, alas! in front of the house where the farmer lives, and expects his wife, his sons and his daughters to live or exist, and then wonders that his wife is discontented, and his children don't like it at home; but then, of course, there are no farmers like that here, and it is bad manners to speak ill of those who are not present. And there are other visions of neat lawns, fine shade trees, houses modest, perhaps, but neatly kept and having some traces of paint, with hammocks and some comfortable chairs on a porch or under the trees.

But you say what has all this to do with the "Farmer's Flower Garden?" Well, these neat lawns, shade trees and an attractive flower garden ought to go together, and when they do not it is not because the farmer's wife does not want them all, nor, to do him justice, is it because the farmer himself does not like these things. He says they are nice, but he has not the time or money for such things. So he goes on in the old way, leaving his wife struggling to gratify her longing for beauty by raising a few discouraged-looking zinnias, nasturtiums or marigolds in a little space she has painfully wrested from the dominion of the weeds. It would only take a few days' work in the course of the season to get rid of the weeds, keep the grass decently short and plant a few trees, if they are needed. It is not even necessary to buy a lawn mower if money is a trifle scarce, although of course it is nice, and in most families the ladies are self-sacrificing enough to run it if they can get it. But the field mower or scythe, used half a dozen times in the summer, will keep the grass in fair condition, and is much better than no care at all. As for the burdocks and other weeds, they ought to be dug up anyway. Why should a farmer allow his door yard to be the worst looking place on the farm? And the trees? Some places have too much shade, but too many homes bake and broil in the hot sun, without a single shady place where one might spend a restful hour, when a single day's work would get, without money and without price, from some good-natured neighbor's wood lot, all the trees that could be used, and those of the very finest kinds, for what can surpass our native maples, elms, birches and basswoods. These things would add something to the money value of the farm, but infinitely more to the comfort and pleasure of those who spend their lives there.

Now, as to the flower garden itself. Well, Mrs. Farmer, when you choose a place for it choose as good a piece of ground as possible. Do not take a hard sun-baked piece of ground close to the south or west side of the house. In August it will be harder than the bricks the Israelites made in Egypt, and much watering — the woman's remedy for all ills of plant life — only makes it harder, and the poor plants choke to death. Try to get a soil with some sand in it, but if this is not possible, add some. Buy, beg or steal some barnyard manure. Get it when you can, how you can, but get it. If you have perennial plants, put it on in the winter, not in the fall, about the first or middle of January after the ground is frozen hard. If put on too early it will be too warm, and scald or smother many choice things. In the spring it ought to be well forked and spaded in; though, if a delicate woman has to do it all and finds this too heavy work, she may leave it untouched around most of the perennials. It may not look as well, but it will keep the ground moist and make it rich. Where seeds are to be sowed or small plants set it must be turned under.

Do not sow seeds too early unless you have a little hot bed or cold frame. If cared for in the house they are a good deal of worry, and housekeepers worry more than is good for them. Flowers should be a source of pleasure, not of trouble. For that reason do not have more than one or two choice varieties in the house to look after, something that must be started early to give it time to develop. Most plants will germinate and grow better under the sunshine and dew of the open air. Take advantage of cloudy days to transplant and change the little plants about. Then, when they are where you want them, hoe, hoe and once again hoe. It is just as healthy, just as honest, and just as interesting to hoe in a flower garden as to play golf, croquet or tennis, and is less expensive and more productive of the greatest good to the greatest number, if you consider the quantities of beautiful flowers that you will have for yourself and your friends; gifts that you may give with equal propriety to rich and poor, young or old, on all occasions whether of joy or sorrow; in addition to which the doctor's visits will be less frequent, while those of the butcher and baker will probably be more so.

Don't water your flowers too much. Watering is too apt to be a woman's substitute for manuring and cultivation, when, in fact, with the exception of moving small plants or forcing larger ones with manure water, watering is mostly time and trouble wasted. The benefit of watering is only temporary. It hardens the surface of the ground, rendering impossible that mysterious action which rightly brings a really beneficial dampness to the surface of well cultivated soil. Good ground, well hoed and manured, will feel dry weather far less than a garden where the weeds are pulled out and a lot of water put on, and it is no harder to hoe than to lug heavy pails of water, that is if you do it yourself, while if the men are willing to help you, they would much rather hoe awhile than to carry water. Of course we know that in the city gardens and parks the hose is used every night and the flowers look very nice, but if this is once begun it must be kept up, and we are now talking of common farmers, who do not always have the water to spare, or else have not the conveniences for using it. With good ground and hoeing you can have just as beautiful flowers as anyone.

What varieties are best? That depends on many things, individual tastes, amount of leisure, size of garden space, kind of soil, shady or sunny exposure, and so on. Annual flowers give quick returns, and are wonderful in their gorgeousness and variety. Many of them are of the easiest culture, such as phlox, petunia, portulaca, alyssum, nasturtium, marigold, zinnia, verbena, poppy and many others will stand any amount of sunshine if well hoed and manured, but there are some that must have a place just to their fancy and sheltered from the sun during the warmest part of the day. Such kinds are pansies, sweet peas, ten-weeks stock and so forth. Every one should have at least a few annuals. They are cheap, easily raised, very showy in the garden, and give a large quantity of flowers for cutting, but in some ways they are not so desirable as perennials. The principal objection to annuals, and one which weighs heavily against them with me, is the necessity of beginning all over again each year. No matter how faithfully you have labored all through the season with your flowers, you are again confronted, when spring comes, with the same bare brown space of earth, which it seemed such a task to fill a year ago, and which is just as empty now as it was then. Again, if you only have annuals you will not have any flowers until they have had time to grow from seed to blossom, and you will have very few flowers in spring and early summer, just when we feel the need of them most keenly after long winter. While if anything happens to delay the sowing of seeds two or three weeks they will be just so much later, and perhaps rather poor, if the weather takes an unfavorable turn, and no amount of coaxing and pleading that the housecleaning had to be done or the baby was sick, or the hired girl quit suddenly, has any effect on their injured feelings.

It is not so with perennials, especially if they have had some manure during the winter. Two or three weeks neglect is nothing to them. Most forgiving of growing things, careless of slight or neglect, they lift their splendid or delicate flowers in every tint of the rainbow, they offer the beauty of their dainty or robust growth and graceful shape for the pleasure of the tired woman, who, if she is really sensible and has a just and proper consideration for her own health and happiness, will lay aside for at least a few minutes each day her cares and worries, also her fancy work, and go out in the fresh air and sunshine to enjoy the company of these faithful friends. The perennial is certainly the busy woman's flower, and in recent years we have begun to realize that it is the artist's flower as well. Judicious planting of perennials will in a few years' time give effects, which, though no brighter, will be at once more imposing and more graceful than can be obtained with any annuals.

Perennials will respond finely to the same care given to the most exacting of annuals, but will do nicely without it if planted in fairly good ground, and especially if given a little manure every year. The manure is most important of all. Some women have a theory that many plants do not require manure, or are even injured by it. I have heard sensible women say that manure was not good for dahlias, and then the next minute assure me that dish water was "lovely" for dahlias, not stopping to think that the dish water was as valuable for the fertilizing material it contained as for the moisture, while the barnyard manure and a reasonable amount of cultivation would give a more even supply of moisture and in the right place, as well as so much more plant food. If planted in good ground, properly cultivated and enriched, dahlias need not be watered in this climate. But let us return to the hardy perennials. There are so many varieties of them, they are so varied in habit of growth, in shape and color of flower, that every taste may be pleased and the owner of a fair-sized collection of perennials may have flowers throughout the season. The first cost of perennials is more than that of annuals, but you only have to buy them once instead of every year, and they increase wonderfully in beauty and value from year to year. In a few years they are large enough so that you can take off roots and have more of any favorite kind, or give them to your friends, which is in itself a pleasure. I class as perennials most of the sorts commonly known as biennials, especially such kinds as foxgloves, sweet Williams and others which frequently live three years, and an ever increasing stock of which may be kept indefinitely with a little care. One should also include the beautiful perennial vines, such as clematis, wistaria, honeysuckle, trumpet flower, perennial pea, etc.

Then we have so many bulbs, lilies of the different kinds, daffodils, hyacinths, tulips and many more, and others like Chinese pœonies, funkias, larkspurs, poppies, campanulas, anemones, spiderwort, iris, veronica, phloxes, violets, yuccas, and larger growing ones like lilacs, weigelas, deutzias, spireas, hydrangeas, Japan quinces or *cydonia Altheas.* Well, the list is almost endless, and I have not mentioned the queen of flowers, the rose, which many people think is truly tyrannical in the amount of care and attention she expects from those around her, yet if the labor is somewhat greater than with other flowers the reward is also greater. Personally, I have not found the labor much more than is required by other things, being so fortunate as to have a place for my roses which seems to suit them exactly, and they grow so luxuriantly that insects and diseases do not seem to make any impression on them. But I think one can afford to powder and spray for mildew and rose slug and rose bug, if by so doing one can have roses in bloom in one's own garden, for there is no blossom finer than the rose, whether it be the blushing damask or brilliant single red rose of old-fashioned gardens, or some gorgeous creation of the modern rosarian.

I have been looking for a good stopping place, but there is none, there never is when an enthusiastic flower lover gets to talking or writing on this favorite subject. Study the florist's catalogues, consider your soil, situation, circumstances and tastes, and have a flower garden as little as you must and as large as you may. If you never had one before have one this year, have annuals or perennials, or both, have expensive novelties, or the old standard kinds that are so good and so cheap, have them together or separately, by the front gate or kitchen door, wherever they will do you the most good, only have them.

Swine Suggestions.

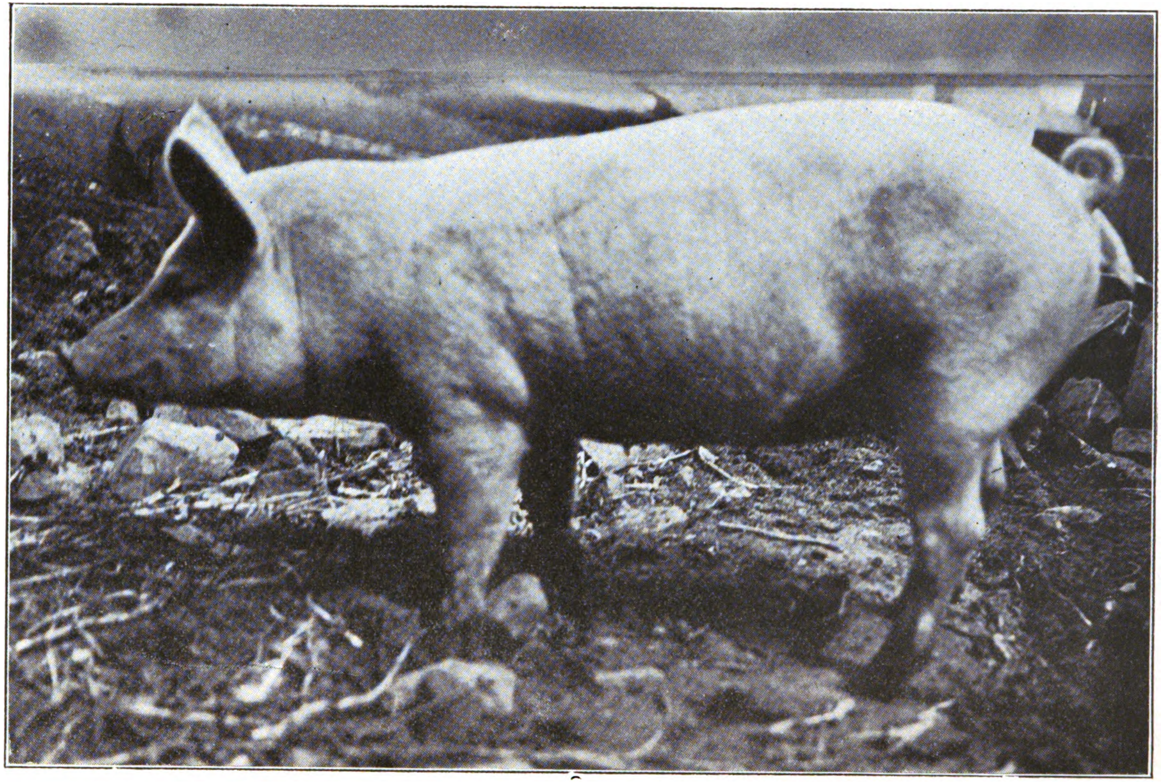
By C. E. Chapman.

I purchased the first sow I ever owned in 1889, and kept her in a small shanty, fed her corn in winter, slops in summer, same as *other folks.*

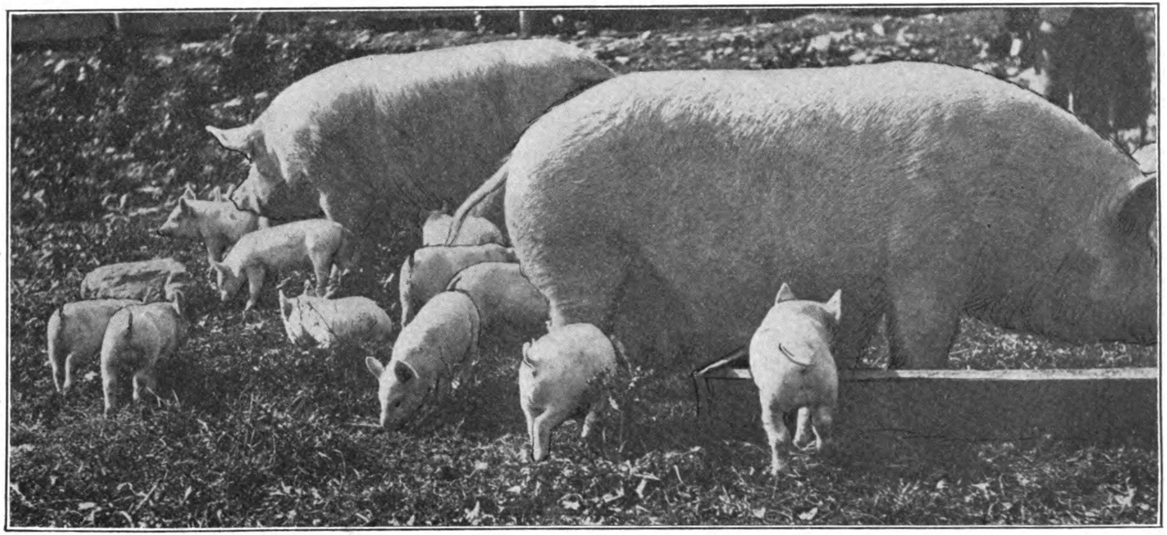
I also shared the general dislike and contempt for a hog, and only bought her to help make a living.

The various mishaps, such as a litter being eaten up by the mother, the numerous losses by being laid on and chilled, I supposed was a part of the risks of the business, and only to be reduced by using some of the various devices for breeding pens. Poverty caused me to regret the losses and to study how to avoid them, until I became quite expert in nailing up rails around the inside of the pen to prevent their being crushed, in planning to have the birth occur in warm weather, and in being able to be on hand at birth, should the mother be pig-hungry. But like other "jockeys," who know all the tricks of the trade, I still would meet with losses.

The fact still remains for consideration, that no device will make a barren sow prolific, will make a sick sow well, will make weak pigs keep out from under the sow, will make late spring pigs profitable, or bring two farrows in warm weather. The latter part of these propositions we need for profit, and instead



No. 1. A Future Breeder.



No. 2. Grazing Cheshire Swine.

of studying how to prevent the first part we should study how to obtain the second. Under the prevailing fashion the cost of the grain, labor and losses reduces the profit until there is not much enthusiasm or pride in the partnership.

After listening to several speakers at the institutes on the "Effect of Food on Health," on "The Dairy Type of Sheep," and "A Cheap Ration for Swine," I began to study the nature, habits, and possibilities of swine, and determined to establish a good strain of hogs. I found, by nature, they are the cleanest of all animals, vegetable eating and take considerable exercise when they have a chance. They are thin-skinned and sensitive to an extreme; to wet nests or storms, as we now breed them. The tough old "*bruisers*" of the forest make a nest of leaves in some sheltered spot, warm, clean and soft enough for a baby. The water-padded muscles of the wild sow make farrowing easy, the exercise makes her healthy, the food prevents constipation, and the young are so strong and active they are never crushed in the circular bed of leaves which would be a veritable death trap to their more civilized cousins.

My first improvement was a place to keep them, and consisted of two box stalls with dirt floors in the basement of a barn, warm enough to prevent freezing, and a house double boarded and stuffed with straw for winter use; two fields and a shed for summer. Both places are kept clean and dry. My second improvement was a change of diet from milk, corn and confinement, to fine wheat middlings wet with water, grass and a range in summer, and turnips or beets in winter. My third improvement was selecting long-bodied sows with fourteen teats, from large farrows, and feeding them on bulky food so as to get a dairy built animal.

The pigs are never weaned, and suck the dam until eight weeks old or the sow is dry; they are taught to eat as young as possible, and gradually eat more and suckle less, which leaves the sow's udder in a good condition, does not get her so poor and the pigs never stop growing; they are bred young to a boar from a large farrow, and drop their first pigs at a year of age. They are fed, while suckling their young, on a milk-producing ration, and liberally, so as to make good milkers of them and also to keep them growing; beets, milk and buckwheat middlings seem to give best results. When a female was produced which gave a large flow of milk, and was prolific, her best progeny was kept. In-breeding was ventured upon in some cases, and after ten years of patient hoping the animals shown in the illustrations have been produced. These sows have never eaten a bushel of corn, are in fine health, bountiful milkers, very prolific, averaging twenty-six pigs per year, and require no attention or patent devices at farrowing time to raise every pig. Swine reared and fed in this manner are easy keepers, respond to a grain ration, and fatten more rapidly than do grain fed animals.

The cost of keeping has been reduced by summer pasture of grass, rape and peas, with flat turnips and beets for winter use, until there is a profit in selling six weeks' old pigs at two dollars each.

I estimate the cost of keeping a sow as follows:

Dr.

150 days summer board	$6 20
215 days winter board	8 60
Labor	2 50
	$17 30

Cr.

Nine spring pigs, at $2.50	$22 50
Eight fall pigs, at $1.50	12 00
Manure	2 00
	$36 50

This makes a good profit as compared with an equal outlay on other common stock. These results are not excessive, and the number of pigs and prices can be easily made much more.

Under present conditions, breeding young, although it may affect the size, unless carefully fed, is quite likely to produce a better suckler and a more useful animal than when more mature, because of the danger of getting too fat and weak in the legs before breeding.

The closely confined brood sows of the East, and the corn-fed ones of the West, have become nearly barren, and a breeder that can guarantee a prolific strain can charge any price.

In my boyhood days, when swine "run the road," they could outrun and whip a dog, but now if a pig gets out a run of ten minutes would kill it. During a recent trip to Virginia, where swine still roam where they like, I noticed that large farrows were the rule and fat mothers the exception.

Barrenness, caked udders, pig eating and crushing, milk fever, and that bane of pregnant animals, constipation, come from improper feeding. For highest success natural conditions must be maintained as nearly as practicable, by interested intelligent men.

Cut No. 1 would be called by some a leggy, light-shouldered female, but she has length of body, a strong leg and the dairy wedge shape at seven months. She was fed for a breeder and developed into the smaller of the two sows shown in Cut No. 2, with a record of twelve the first and thirteen pigs the second farrow before she was two years old.

The Open Doors.

By Katherine Mills.

When I was in New York a year ago last fall it was my good fortune to meet a cultured, middle-aged society woman, and she, thinking to be agreeable as well as to get acquainted, launched forth this most unexpected question: "Miss Mills, what's your hobby? You know every girl has a hobby now-a-days. Now, I should like to know your hobby." A short mental enumeration of my abilities and inclinations — wise and otherwise — revealed to me as well as to the lady the answer: "I don't know as I have any particular hobby." What did that lady do? She was too well bred to turn her back, but her manner said only too plainly: "Well, if you're a girl without a hobby, I don't want anything more to do with you." And all the rest of that day she kept that attitude toward me. To put it in other words, I fell from grace entirely in that woman's estimation, and all because I didn't "go in" for any particular thing.

So, because I knew enough about that lady to respect her opinion, I began to wonder if I had made a mistake, and if I ought to adopt one thing, stick to it for a time and call it my hobby. And that led naturally to the next question, "What object or pursuit might I, a farmer's daughter, living in the town of New Lisbon, adopt and follow to the end, or else until I tired of it?" And though I have thought much, I am still unable to answer that question, and that for at least three reasons.

The first reason is "Lack of time." The average farmer's wife or daughter is too busy to have a hobby, if we say hobby as we commonly mean it; a favorite object or pursuit for the purpose of self-culture and amusement. The second reason is an excedingly good one: "Hobbies cost money." The third reason will be told later.

So, to pursue the question still further, we must ask: "Are the opportunities of life for the farmer's wife and daughter hopelessly narrower than for her city or town friends?" "Are the doors of culture and refinement along every line closed or are they open?" "Must her life, of necessity, be as narrow and circumscribed as her city sister is inclined to consider it?" Not feeling sufficiently familiar with town life to discuss these points, I asked a number of people these two questions: "What, in your opinion, is the greatest disadvantage to the farmer's wife and daughter of living in the country as compared with life in the town or city?" And second, "What is the greatest advantage?" I have received a variety of answers. Here are some of them:

Says a lady who, after living most of her life on a farm, has now moved to the village: "You can accomplish more on the farm than in town, because there are fewer interruptions. One has plenty to do with and to cook with. When company comes and you want cream for your pudding, you don't have to substitute skim milk."

This woman says she finds no disadvantage whatever in farm life.

Said a cheery-wayed farmer's daughter, who is also a teacher: "One has more time for self-improvement on the farm than in town unless one belongs to clubs. Then, I think, one enjoys more of the comforts of home life than when living in town." She thinks the farm lonesome in wintertime. "What is more pleasant than an open house filled with fresh air and the odor of apple blossoms," says a lady who, after living some time in cities, is now a most successful farmer's wife. "Other advantages of country life are fresh country products. You can drive your own horse. You are away from the bad influences of the city." This farmer's daughter stays in town because she don't like farm life. She says: "The greatest disadvantage I found personally was the hard work and not time enough to develop my social nature."

This comes from one whom you all know, so I think I will call him "Mr. Thoughtful." He says: "The woman on the farm has more chance to keep herself informed on the topics of the day because she has more time to herself. Also, she has less to do than the woman in town because she has not so many outside demands on her time. On the other hand, she is not in touch with the movements of any community, and she has a tendency to grow narrow in her views. This causes her to misunderstand the attitude toward her of the woman in town, who really respects the farmer's wife and consults her in times of trouble."

And now I wish to quote from the long letter of a city woman who lived her early life on the farm: "There is more true friendship in the country than in the city. I meet many people and I know nothing about their family and home life, and if I call they take me into the parlor, and many times I do not see another member of the family, and I come away as ignorant as I went as to their family relations, what and how they get their living and what their household consists of, and yet people are drawn to the city. It must be the change and excitement. There are women here who work until midnight, and in the strain upon them of keeping up appearances they are worn out. Country life is far preferable. Of course there are many advantages in the city of hearing the best of music and lectures, and advantages of society. I confess I had rather hear Dr. Barthelow than any country preacher I ever heard, but yet I do not know as I am any better." The greatest disadvantage of farm life, says every woman in or out of town that I have asked, is the difficulty of getting away from home. "It is so hard to get to church and to entertainments," say they.

Thus far have been mentioned only open doors of advantage. These doors open inward into the home life of the farmer's wife and daughter, and we have been told of a few things that bar the doorway. Now let us turn our attention for a time to doors of opportunity, that open outward into the world of thought, of culture and of skill. At this season of the year, ordinarily, the housework is done by at least half past one o'clock, and from that time until four is a short rest hour. Then, too, we have had the time during the long winter evenings. But, you say, there is always a full mending basket or sewing to be done. Does not the mother owe it as a duty to herself and to the children whose companion she wishes to be, even up to womanhood and manhood as well as in childhood, to spend some considerable time toward her own self-improvement? Would not the farmer's wife better serve her family in this way than to spend all her time in looking after their temporal welfare? As for the daughter, these opportunities open wider to her in her youth than at any other time in her life, and in view of her surroundings in society and in view of her future she cannot afford to neglect them. Mind you, this is not saying that a farmer's wife or daughter must spend her whole time doing the things to be described. We are just trying to tell some of the opportunities the farmer's wife and daughter may have of spending their spare moments, be they more or less, for her own good.

The first open door of which I will speak is "the opportunity for reading." We have been told that the farm is lonesome in winter time, and that there is not sufficient chance to develop the social nature, and in a certain sense, this, perhaps, is true. But, on the other hand, there is a society open to the country woman and to the country son as well, a society composed of the first and best people of all ages and of all lands, and they have written for us their best thoughts in their best language, and we may associate with them at will. Why be lonesome when it is possible to associate intimately with such people — for books are cheap now-a-days. What richness of thought and spiritual development may be gained by an hour spent with Ruskin or Drummond! What a delightful sense of companionship we feel when we can rejoice in the joys and sympathize with the sorrows of those characters which Dickens and George Eliot have made almost real! Home may be made more pleasant by a knowledge of good books — not forgetting to mention the cook book — and of the great movements of the day, for conversation is easier and ideas are broadened by the knowledge of men and things which is obtainable only through the medium of the printed page.

The second "open door" of which I will speak is "the art of fine needle-work," and what home is complete without somewhat of its adornment. Its varieties are endless, and as we pass through the list of knitting, crocheting, netting, all useful and ornamental, we find that Mexican drawn-work is not half so difficult as it looks to be. Real lace requires a true, close eye and skillful fingers. Even solid embroidery is no impossibility. It is surprising how many of these things one can accomplish when there is a little determination behind the inclination.

Do I hear certain questionable sounds from part of the company here assembled? Evidently a portion, at least, are not in sympathy with this particular subject of woman's work or pastime. Will you please listen to a quotation from a certain good old book whose authority I hope you do not question? "And with him was Aholiab, son of Ahisamach, of the tribe of Dan, an engraver, and a cunning workman, and an embroiderer in blue and in purple, and in scarlet and fine linen." It's true. Fourteen hundred and ninety-two years before Christ we find a man doing solid embroidery. These two great accusations may therefore be laid at the feet of our sex. Woman "lost man Eden," and she stole from him the art of doing fancy work.

A pursuit which requires more time and withal more talent and more money than any other mentioned is the study of music. But when we think of the homes that are made brighter by its influence, must we not conclude that, after all, it pays. If a little spare time spent in learning the piano or organ or other musical instrument results in keeping the father and brother at home in the evening, and if the members of the household are brought into closer touch with each other through its magic influence, will it not amply repay the time spent, to say nothing whatever of self-improvement?

Another limitless avenue of study which is open to the country woman is the study of nature, and theoretically I ought not to be obliged to speak of this at all. The truth of the matter is, however, that we don't know the names of half the weeds that grow in our own door yard, or the life stories of half the moths that flutter around the lamp on a summer's evening, nor yet the name of the bird that nests in the shade trees by our very window. These three branches — the study of plants, birds, and animals — have occupied many a man's lifetime, but we pass them by as things of little value. We are so much more interested in the fact that Mary Jones has had three new hats and three new dresses in the past year, and that the minister's wife went by and did not look toward the house. I am not saying that we ought to spend our hours and days in studying these things — fascinating and useful as the pursuit is to many — but that, if we have eyes with which to see, and the ability to ask questions, we might learn something about these things every day without spending much of our time, either. More than that, we ought to take pains to know these things because they are a part of our very lives, and, indeed, not a little of our prosperity is dependent upon these same plants and birds and bugs. I don't mean to say that I myself know all or anything about them either. It is just one of many pursuits open to country women.

Another pursuit which conduces very much to happiness and to the enjoyment of country life is a development of the artistic sense through the study of the beauties of nature. The farmer's daughter and wife are in the midst of Nature's great art gallery. What if she lacks the opportunity of seeing fine pictures, and does not know a wood cut from an etching, and has never heard of Copley prints? What if she can't draw a picture or paint forget-me-nots on pink silk? All about her is the finest of coloring, the most beautiful of ever-changing scenery, with its gradations of light and shade, with variations of color from most brilliant red to deepest violet. Why, why do we not look for these, see them grander, more beautiful than the city woman sees them in her short visit to our country homes? More beautiful because they are part of our very selves, of our life-long environment, but instead that is the reason why most of us fail to see them at all. Many of you have ridden over the road up and down this valley on an average of at least once a week all your lives. Did you ever think of it, that you never tire of it? And yet you say you know every tree and every stone. *Why* don't you tire of it? Unlike the painted picture, it is constantly changing. It is the same, yet not the same every day. And behind all this is that which appeals to our instinctive love of the beautiful which Mrs. Browning so beautifully expresses:

> "Earth's crammed with *heaven*
> And every common bush afire with God."

If the observation of the beauties of nature here made, should produce a practical result in an attempt to beautify the door yard by clearing away some of the rubbish, I should feel amply repaid for the time and trouble of writing this.

There are many other pursuits open to country women which afford amusement and pleasure, though they are not especially instructive. Among these may be mentioned photography, bicycle riding, painting, etc.

In conclusion we admit that it is difficult to get away from home, that there is plenty of hard work attached to farm life, and that the country woman has a tendency to grow narrow in her views. We accept the first two as inevitable, but the last is the country woman's fault, and her's alone, for farm life affords abundant opportunities for broadening ideas and sympathies if the farmer's wife and daughter will but make use of them.

Now comes the third reason for not having a hobby. It's just because there are so many things in the world to do, and so short a time in which to do them, that it does not seem possible or right to adopt any one to the exclusion of the rest.

One thing should not be forgotten. Another door open to the farmer's wife and daughter is the writing of papers for farmers' institutes, and I cordially invite my sisters to enter where I most willingly pass out.

The Cause of Failure in Grass Seeding.

By W. B. Cleves.

The most persistent and costly feature in grass culture of late years in the Middle and Eastern States is the failure to secure a stand. The reason usually given for this failure is "dry weather," but, as the average annual rainfall has been shown to be virtually unchanged, this reason is not adequate. Lack of moisture in the surface soil at the time of seeding is undeniably the cause of failure in the main, but this lack is due to the condition of the soil rather than to a deficiency in rainfall.

The soil upon farms which have been under tillage for many years, and treated according to prevailing methods of farming, has been robbed of nearly all its humus, and with it has lost largely its capacity for holding moisture. If plowed in the fall it is likely to be drier than it should be, probably the plow pan formed at the customary depth of furrow is hard and compact, and hinders the ground water from coming up freely, and the newly plowed soil is not made fine and compact enough throughout to bring even the scant supply of water up to the seed beds. Again, it often happens that the ground lies for hours under the hot sun after harrowing and before seeding, and thus its moisture has evaporated before the seed is sown and the seed lies dormant in this dry bed until some chance shower quickens it.

If grain has been sown with the grass seed the grain appropriates the lion's share of moisture and the grass seedling is left to die of thirst. This is what actually happens upon a large percentage of fall seeded ground.

The effectual remedy is a radical change in methods, or rather the adoption of method in tillage to supply the soil with humus and to conserve the moisture. Just how to do this upon all soils and under all conditions cannot be told within the limits of this article, but may be learned from books devoted to the subject — among which are *The Fertility of the Land,* by Roberts; *Principles of Agriculture,* by Bailey; *How Crops Grow and How Crops Feed,* by Johnson. A few dollars invested in such works will, if the reader be possessed of the sound sense to make the information available, be repaid many fold every year.

In the semi-arid regions of the West the problem of conserving moisture in the soil has been forced upon farmers, and the outcome of their intelligent struggle has been the reclamation of thousands of acres hitherto unprofitable, and a large increase in the crops produced upon all the soils treated. We of the East have no such difficult problem, but can learn of the West how to make the most of the rainfall and thus to insure immunity from the ravages of drouth.

The practice of seeding to grass with grain is justly regarded by many as a mistaken economy. Instead of getting two crops for one plowing there are two half crops. Whereas if grass and clover are sown by themselves on well prepared soil in early spring they will make a profitable crop of hay the first season, and with much less labor than would be outlayed upon grain and grass.

Farming from an Optimistic View-point.

By E. H. Clark.

An optimist is one who takes a cheerful view of things. Job was an optimist of the first water. The loss of health, wealth, family and friends didn't make him long-faced or lugubrious. We see in a large measure what we wish to see. When our chairman went courting, for instance, I presume a certain young lady saw in him an amiable, talented and handsome gentleman, and she was sure he would make a model husband. There is a big, broad, bright side to farm life, if we will only look for it. The farmer's calling has numerous advantages, physical, financial, social, mental and moral. To-day I will confine myself chiefly to the physical and financial aspects of the case.

First, then, as concerning our physical advantages. A few days ago I saw a large number of farmers at the State Grange meeting in Syracuse. They were, for the most part, strong, stocky, stalwart men, and withal of a ruddy countenance. In a store near by the clerks were noticeably short, slender and sallow. Statistics show that the farmer is one of the longest lived of men. To be sure, the clergyman outlives him, but then he is in a picked class at the start. A young man who completes a college and theological course must have more than the average degree of physical vigor at the outset. We could live longer, too, than we do, if we didn't eat so much, eat so fast, and at such irregular hours. Some of us at least live on the fat of the land, beef and chicken that are not as tough as a pine knot, beautiful bread, sweet and tender vegetables. Please take dinner with me next week. Maybe there'll be real cream for the coffee, the Babcock test gave my cows a record of 5.2 per cent. last month. When you taste my wife's pies and puddings you'll want to come again. A Palmyra granger once visited a Brooklyn friend who drew a $3,500 salary. "Great guns," said the farmer, "what do you do with so much money?" "Spend it each year, and I don't live as well as you do," was the reply.

They tell us that we work so very hard. That statement had some force in our grandfathers' days. But now, the riding cultivator, the barn sling, the self-binder and the corn harvester, tell a different story. The creamery and the laundry, too, lighten the labor of the farmer's wife. But suppose you do use your muscles somewhat, why not look upon the work as beneficial physical exercise. If you pitch hay or chop wood just imagine you are engaging in gymnastic performances. When you plow remember that is easier than to row a boat or play base-ball. I'd rather hoe in the garden than paint on top of a thirty-foot ladder. Our labor is light as compared with that of the doctor, blacksmith, the railroad hand, the iron worker or the miner. Some think the merchant and the bookkeeper have an easy time of it. But many of these men endure a nervous and mental strain that to you and me would be almost insupportable. Two of our greatest blessings are so common that we are apt to forget them entirely, viz., pure cold water and refreshing sleep. The city gentleman may have a softer bed than we do, but does he obtain as much good from it? People sigh for the climate of Florida and Southern California, but what do they find to drink when they get there? Ice water is too expensive to use, much of it. Even in our Northern cities, how inferior is the water to that of the farmer's well!

We are charged with working so many hours in a day. For a time, in summer, there is some truth in the charge, but right here let me ask a question? How many men here to-day average eight hours per day, of what we call work, for 310 days in the year? Do you think this is a wild guess? Then estimate carefully the number of hours you sit by the fire in winter, the time spent in visiting, reading, on rainy days, out camping, in town, at the Grange, etc., and you'll be surprised at the final figures. I asked a merchant in this village how many hours he worked in a day. "From fourteen to eighteen hours every day," was the reply. The farmers, many of them, have time to read a good deal. One said, lately, he took five agricultural papers. I'm reading plenty of periodical literature this winter, am reviewing Shakespeare and Macaulay, and have read twenty other books beside.

Secondly, the farmer's prospect to-day is financially bright. Of course, I mean the man who is adapted to his business, and not a square peg in a round hole. I refer now chiefly to those who own but a small number of acres and who practice mixed farming. Of course, some believe in special farming. The story goes that a Kentucky farmer was a strong advocate of this theory. He therefore planted his whole farm to popcorn. The crop was good and he filled a great barn with the corn. He meant to sell the crop for $20,000. But the barn caught fire, the interior heat popped the corn and sent it far and wide, like bullets from a gun. It was claimed that that popped corn covered a whole township three feet deep. The neighbors brought suit and recovered $5,000 damages because of injury done by this trespassing corn. A Nebraska farmer is said to have fared better. He tried to get out of the old-fashioned way of farming. Seeing that a great meadow he owned was overflowed by a river each year, he reasoned that the freshet contained fish, and he would like to catch them. So he strung a barbed wire fence on the lower side of the field. The floods arose, and by and by subsided; and lo, behold a huge fish was hooked fast on each barb of the wire fence. He sold the fish for $1,500.

Some do well at special farming, growing onions, peaches, grapes, etc. But in this region in the majority of cases safety seems to lie in small areas given up to diversified farming. At all events this kind of farming has paid well in western Wayne county for years. With help scarce and high, the small farmer does much of his work himself. In haying time, for instance, he changes work with his neighbors. Smith often owns one horse and Brown another, and the two combined form a team. The two men own tools in partnership and save much in that way. It's quite customary now-a-days for the man who owns or works 200 acres to buy more tools than he can afford to keep. It's a great tax for a large farmer to build and keep up fences and buildings. He is very apt to fail also in maintaining farm fertility. One small farmer was lately pleased to find that the value of products from his two cows last year amounted to $150, and his poultry to $125. One sold $120 worth of beans from two acres, and another $500 worth of beans from ten acres. Mr. A. sold peas to the amount of $500 from ten acres, Mr. B. sold $200 worth of potatoes in 1901 from two acres, and Mr. C. $1,000 worth of raspberries from six acres. Mr. D. obtained 2,000 bushels of fine apples from seventy-five trees last fall, and Mr. F. told a story even larger than that. On one street near my home there are to be found eight farmers within a distance of less than two miles. All started in life with little or nothing. Nearly all are quite young now, except one who died at fifty-four worth more than $12,000. One has Brussels carpets in the parlors, and all have made money with astonishing rapidity. One main spoke in the wheel of their success has been the dry-house. One man told me this fall that a moderate-sized dry-house netted him between $300 and $400 within six weeks. If you should think best to pronounce the Twentieth Century Limited train the eighth wonder of the world, then please let me call the fruit-drying industry in Wayne county the ninth wonder. Forty years ago my father owned a farm of 107 acres. To help get out of debt he sold fifteen acres off from the rear end; since his death I sold twenty-four acres more, and now sixty-eight remain. The thirty-nine acres sold were divided among four families, each owning a few acres. Three out of these four families are simply making money, and they live well, too. Each of the four has a dry-house. But a few years since a young man nearby bought a ninety-acre farm for $4,000, and made a payment of possibly $500. He grew raspberries on a large scale and cared well for his orchard. Now he rides in a rubber-tired buggy. Another started with nothing and worked a farm on shares for a few years before buying a farm; to-day he is only fifty years of age, his residence is heated by steam and it cost $25,000. We know of hundreds of similar cases to these above mentioned in western Wayne. Many of them have not enjoyed a wonderfully large income, but they were wise enough not to spend money faster than they earned it. Now most of them spend money quite freely, and they are able to do it. Why is it that so many in city and village do not save more? I have in mind two brothers, each not far from forty years of age. One owns a fifty-acre farm, nearly paid for. He has succeeded partly by means of raspberries. The other moved to Rochester and has usually earned good wages; he isn't worth a dollar in the world, except the value of his household goods. I recall four brothers also from another family. One went to the city and secured a good position; he spent his money as fast as he earned it. The other three each own a small farm and are doing well; they don't spend seventy-five cents every day, however, for cigars and tickets to the theater.

Many farmers also owning from 75 to 125 acres are meeting with success. Some grow beans, others potatoes, sheep, etc. During a year or two past many have raised and sold hogs to great advantage. But the two main cornerstones have been cows and apples, and they are likely to retain their proud pre-eminence. There seems a great future ahead for the apple orchard. Cows are worth far more to New York State than gold mines. They add to our bank account, and also to the fertility of the farm.

One man said lately that his sales last year from his 120-acre farm amounted to $1,400. He was well pleased with the year's income, but he would have been pleased still more if he had also carefully estimated the value of that part of his living derived from the farm. I presume that such an estimate would amount in his case to about $300. He has a large family, and they live well. Many of us do not realize how much of our living comes from the farm. If we had to buy our flour, apples, potatoes, butter, meat, vegetables, etc., it would open our eyes. Suppose you compare the mortgage-paying ability of a bookkeeper with that of a farmer. The bookkeeper is well paid for one of his class; he receives $1,000 a year. In the country that sum sounds like a large salary. The farmer's sales amount to $800, but his living derived from the farm, added to the $800, brings his income up to a thousand likewise. But the bookkeeper's running expenses are proportionately much greater. He must wear good clothes and sometimes buy three new suits to the farmer's one. Result, the city man barely pays his interest, while the farmer pays $200 annually on his principal. Good friends, the simple facts are that hundreds of mortgages in this county, especially on small farms, are being whittled down at a rapid rate.

We hear much said about the rush, so to speak, from country to city. If this is all true, then we who are on the farm had better *stay* there, for the city must be fed and it calls for our eggs, butter and fruit. The faster the city grows and the smaller the number of farmers the higher price we will get. We must produce what the city calls for. On this point do not be afraid of the Great West. We can furnish Rochester with milk more cheaply than Iowa can do it. But people do not always go from country to city. Within two miles of my home may be counted persons who have tried village and city life, more or less, and have returned to the farm. Some say the tide cityward has reached its height and is even now beginning to flow toward the country. Others say it's only a question of time when the reaction will be greatly in favor of country life. Will not the trolley car, sooner or later, so intermingle city and country that it will be difficult to discover the boundary lines of either? The *New York Independent*, for example, is heading a veritable crusade in favor of life and green fields, "far from the maddening crowd." This journal rightly believes in pure air and in the physical and moral, as well as mental, development of the race. The editors contend that the educated man of the future will delight to spend much of his time near the great heart of nature. Heaven speed the day when such sentiments will more and more prevail.

Happiness of Life on the Farm.

By Mrs. Ida Hull.

As we enter this new year, ought we not, as farmers and farmers' wives, enter it joyfully, filled with all the glowing prospects that fancy can invent? I now see the morning star of hope shining in the beauty of young life upon each one as he realizes that to him is given a new year in which he may be prospered and his greatest aim achieved. Great is the beauty of this star of hope as it brightens the face of man. How grand it appears as we look upon it in the morning of this new year!

What is this happiness and how may we acquire it? There is implanted within the bosom of every person, from the youngest child up to the old man with gray hairs and tottering footsteps, an innate desire, or perhaps, a demand for happiness. And the ways and means used in satisfying this demand are almost as numerous as the people themselves. That which is the greatest source of enjoyment to one may yield but a stinted measure to another, while a third can find therein only weariness. It is of vital importance that we should be able to make a correct estimate of the various pursuits of life that we may know where lie the regions of failure and disappointment and where true happiness in the form of substantial good may be found. The great John Milton found his happiness in "loneliness," as it has been termed by one. "He would shut himself up within himself while his fancy reveled in the presence of the Deity." The solitude of the study afforded Sir Isaac Newton great enjoyment. So strong were the characteristics of quietness and reserve in him that he found almost the only pleasure of his life in solitude and silence. Hour after hour he spent in solving the abstract problems of mathematics and in discovering the hidden laws of nature. In his work he was happy. What a striking contrast to these is presented in the tastes of Napoleon. He found his enjoyment in tented battlefields and in the command of armies. He acquired a taste for these pleasures and for these only. The grand fields of nature and of art had no attraction for him. Even at the hour of death his fancy reveled in the firing of cannon and the fearful carnage of the battlefield. Some find pleasure only in what is termed gay and fashionable life. Domestic joys, military powers, literary honor, none of the intellectual or elevating pursuits have for them any charm. There are others who find their greatest happiness in deeds of philanthropy. Take, for example, the greatest philanthropist the world has ever known. He whose mission it was to go about doing good. We see in His every act the motive which ruled His life, "to love to do good unto all men," from His smallest kindness to the publicans and down-trodden Gentiles to the crowning act of the giving of His own life for the human family that He might secure the greatest possible good in return. Truly, such must have been a happy life. There are some people in the world to-day (and most of us know a few of them) who seem to know exactly how to make the best of everything. Sometimes it is said they have a certain knack for getting over difficulties and making the best of everything as they go along. Nothing is ever so bad to such people who have the faculty of finding a bright side to the darkest cloud as it is to those who have not. Some of the people who have the most trials possible in this world and have been through many deep waters are invariably trying, and are really succeeding, in making the very best of everything. No doubt these people are happier for having this grace, and it is a certain thing that they are much more helpful to their fellows and a vast deal more useful in the world. When we contrast those who have cultivated this grace with those who have had, perhaps, not so much to make them sad and to make them look on the dark side of things, and see the difference in their influence and their usefulness in the world, words are not sufficient to show the advantages of belonging to the former class.

Human experience teaches that as long as we are busy we are happy and interested; that man finds his highest happiness in work and his worst punishment in enforced idleness. We must each and every one of us work according to the talents and ability given us. Do the little things that are necessary, enlarging and doubling upon our own supplies, never presuming upon other people's attainments for a measure for ourselves. Others have builded for us and we must build for others, for posterity, for the future, but build we must. Much of the happiness of our lives depends on how much we sacrifice self and how much we do for others. All of us have enough to be troubled about. All of us have enough to be blue over. But, on the other hand, we all have enough to be thankful for, enough to make us strive to see the bright side of life and to make life happy. Life on the farm, like life everywhere else, is mostly what we make it.

Bee-Keeping.

By R. L. Taylor.

This is a broad subject, and in the time properly at my disposal I can do no more than touch lightly the more prominent points that present themselves.

Taking the year through, bee-keeping is, I think, of all outdoor occupations, the most exacting. Not that it requires the steady grind of farming — there is more variety in it — its labors are more intermittent. What one week requires may not be needed again for a year, but the requirement of the week must be timely met. Especially do circumstances of temperature in the springtime affect the character and duration of work. To determine the proper thing to do requires constant mental alertness, and herein is one marked difference between bee-keeping and some other outdoor occupations. The farmer harvesting his corn and potatoes, for instance, may for one, two or three weeks grind away with little thought required, except to be early in the field and late in leaving it, but in apiculture each day must largely determine its appropriate work. To adequately meet this characteristic there must be thought and such a constitution of mind as enables one readily to drop one thing and promptly turn the attention to another. The successful bee-keeper may not indulge in ruts, or, if he does, he must be able to lift himself readily out of them. The possession or the want of these qualities makes or mars the bee-keeper. Mental vigor makes him successful, mental apathy a failure. So it is forced upon our attention that successful bee-keeping is largely in the man and this, we may gather, requires more and more emphasis as we contemplate the subject further.

But intellectual activity is not all. The successful bee-keeper must have certain items of knowledge. If he has success in the business at heart, this will naturally follow. First in order, after old Sol swings well to the north, and gives a lengthened day and a broader smile, comes the necessity for a knowledge of the conditions required for abundant breeding. The earliest possible attention must be given to colonies light in stores. Bees are great in economy. They keep an eye on the future and will draw but lightly on scant stores. As such conditions cannot produce the desired increase, the case is urgent. Colonies in want should be early selected and marked, and on the first day warm enough for the bees to fly freely ample stores must be supplied. I would emphasize the word "ample." Sufficient is not enough. And do not put this business off. Procrastination is the thief of the honey crop. Follow this in warmer weather by uncapping some of the stores and the cautious interchange of combs. Often strong colonies, heavy with stores, will not uncap enough honey, nor voluntarily extend the circle of brood fast enough to secure the largest increase. Help them. Uncapping causes them to use more, both of food and fuel, thus increasing the warmth of the brood nest and the amount of the brood. Sometimes there is a good flow from willow and soft maples. Look out in such case that the queens in heavy colonies are not crowded for room. Put on a super or exchange empty combs for two or three heavy with honey. Do everything reasonable to bring early and heavy swarms. The number of bees — not the number of colonies — gives the honey crop.

Later the bee-keeper will have in mind that producing bees cost honey, and that in more ways than one, and that such production is unprofitable, unless the resulting bees are to have a chance to make full recompense. In most localities of this latitude the clover and basswood flow gives the valuable crop; he will realize that it is manifest folly to sacrifice a large per cent of that, in rearing bees to spend their life in a season of dearth, and will utilize his knowledge of the time of the cessation of the flow by discouraging the increase of brood rearing from thirty-five days before that time till the flow ceases. To this end he will at least hive swarms in small brood-chambers, say, of about five L frames' capacity. In this connection he will take care that the swarms are as large as possible. I mean by that he will draw as heavily as is prudent from the parent colony. This, first, by hiving the swarm on the old stand so that it may be increased by the bees that are abroad in the field and then by other devices until the old colony is so depleted that it will not cast a second swarm. The prime swarms yield the surplus. How many would-be bee-keepers have I known to leave the supers on the old hive and leave the prime swarm throughout the season with no place for surplus.

Some years it will be found that prime swarms hived in a contracted brood-chamber are possessed with a strong desire to abscond. Giving each two contracted brood-chambers one above the other for three or four days will generally repress the desire, after which the lower one should be removed.

It is now the balmy month of June. White clover is blooming; the shaking of a comb from a good colony sprays the grass with the crystal nectar. Supers are to be adjusted and issuing swarms secured. This time should be the very acme of the bee-keeper's activity. But the siren "ease" solicits with her song. Incense-breathing morn, with all nature full of the song of birds and of all living things, the shooting twigs and diamond-decked foliage invite; the noon shade of grove and orchard tempts, but all entice to destruction. Once, the story goes, Ulysses sailed upon the isle of the sirens, who tempt to death with such sweet songs that they are all but resistless. To escape he filled the ears of his men with wax and tied himself to the mast of his ship.

For the bee-keeper there must be no yielding while duty calls. He will know that now the middle of the day must be given to the securing of swarms. Early and late he will give attention to all colonies requiring room in the supers. The rule should be: Enough room, but not too much. I am speaking of comb honey. If heavy, almost completely filled, sections are desired, give scant room; if lighter ones, with a row of uncapped cells around the wood are satisfactory, then more room may be allowed, but do not give an added case till the last one given is well occupied by bees, and not then unless overcrowded with bees, till the last one is half or two-thirds full of honey. This in the height of the season. As the season advances great circumspection must be exercised, and, as the end of the flow begins to come in view, only patent necessity should lead one to give a colony another case, unless it be a case of partly finished sections gathered from cases of honey removed.

One should early begin to look out for cases in which most of the sections are well capped. Those completed should be removed and stored in a warm, or better, a hot, dry room which can be artificially heated in damp or cool weather. Rich, thick honey is irresistible. Thin, watery honey spoils the market. The unfinished sections from the cases removed should be collected and at once returned to colonies most in need of room. Finally, as the white honey season closes so that no more capping can be expected to be done, all comb honey should be removed and stored as before. Leaving honey on the hive, especially after the season closes, darkens the cappings. The market demands honey having cappings free from stain.

Swarming time is the best one for the easy improvement of one's strain of bees. The intelligent bee-keeper will now have an eye out to the chance of benefiting himself in this respect. He will weed out those which are too irascible for comfort, and all others that exhibit any marked defect in regard to any desirable quality, by destroying the queen cells of each after it has cast a swarm and giving it a good one from a colony that has pleased in all respects.

I have no doubt that bees can be improved by selection in many points, such as beauty of capping, good nature, etc. But, as to securing any marked improvement in wintering qualities and honey-gathering qualities, I have my doubts. You may say: Have not cattle been greatly improved by man, and why not bees? To answer that intelligently it is necessary to compare the two cases. What did natural selection do for cattle? It developed in their ability to endure hardness and to protect themselves, either by running or by fighting. What did it do for bees? For untold ages it eliminated all, even in the leanest seasons, that failed to secure sufficient stores to last them over the ensuing winter. In like manner all lacking in any degree the qualities necessary for good wintering have been rejected by nature. So, for tens of thousands of years there has been a persistent, relentless and most efficient training to secure excellence and permanence in the very qualities which man most esteems, to the extent that practically we possess bees with pedigrees running back into the ages, showing a line of ancestors having for the time the highest possible efficiency in respect of the qualities of honey gathering and wintering. Notice that nature has continually cultivated in bees the very qualities which man desires in them, but in cattle qualities for which man has no use, notwithstanding not a few queen breeders are proclaiming glibly the wonderful improvements they have secured in the course of a few months! When men succeed, in a marked degree, in producing cattle better fitted to endure hard conditions, and better fitted by fighting and by running to protect themselves, we may hope to do something for bees in these respects, wintering and honey-gathering. On the other hand, it is not a difficult matter to make improvements in points about which nature has not actively busied herself. Thus man can make great improvements in cattle in respect of beef and milking qualities, so, if you would improve your bees in honey-capping qualities, or if you would change their color, you may expect to meet with considerable success, because these are qualities about which nature does not so earnestly concern herself. In other terms, in both bees and cattle, those qualities necessary to the persistence of the two races severally have been developed from the necessities of the case, and we may say very highly developed if they are not, indeed, developed to the limit, since they have been to the school of the ages which has no holidays; but those qualities, not material to the continued existence of the races, as fine beef in the one case, and fine capping in the other, have received little or no cultivation. We may well despair of improving qualities already completely developed, while the improvement of those which have never gone to school would, we may suppose, be easy.

Sometimes also we hear some one descant in hopeful tones of the prospect of breeding out the swarming instinct. When swallows forget to build nests and rabbits to rear young expect bees to shun swarming. Swarming is their method of increase.

But a word of caution is necessary. Take notice that the improvement of cattle into good beef-producing animals is, in a sense, a retrograde movement; that is, it is going counter to the training of nature's school. How much less able would the modern Shorthorn be to escape either by running or by fighting than would have been his ancient progenitor? So with bees, though it may be difficult to make them better honey-gatherers, it may be easy to cause them to degenerate. I cannot avoid quoting from Virgil:

> Facilis descensus Averni;
> Sed revocare gradum Superasque evadere ad auras
> Hoc opus hic labor est.

Which some one translates:

> Avernus gates are open night and day,
> Smooth the descent and easy is the way;
> But to return to heaven's pure light again,
> This is a work of labor and of pain.

The danger of descending, that is, of undoing what nature has accomplished in the case of the bees comes from the fact that much advice is given and much done for the nursing of colonies that have barely endured the winter, and also from the fact that much fall feeding of those that have not secured sufficient stores to enable them to pass the winter has been done. In doing this we are fighting against nature and undoing her work in her effort to keep our bees up to the highest standard, unless we use considerable care in preventing such bees from propagating themselves. There was virtue in the old custom of sulphuring such colonies. Nature would have destroyed them all.

Child Culture.

By Mrs. Helen Wells.

There has never been a great reform movement that was not called forth by existing conditions, and from the time of Martin Luther up to the present day the disseminating and carrying out of the work of reformation has been done principally by women. Look into our churches to-day. Which sex predominates? Attend a missionary meeting of the same. *Who* are the workers? If all the feminine element of the great church ceased laboring, whence would our great missions derive their strength? In the temperance movement it is the same, so much so that the familiar W. C. T. U. does not cause any special attention, and yet that stands for *Women's* Temperance Union. At first sight it might seem to convey the idea that women principally stood in need of temperance reform! But the world knows it is the insignia of the workers. Our great charitable institutions, by whom are they managed? Look over the lists of "directors'" names, and the predominance of women's names will answer.

To-day the trend of public thought is turning toward child-culture. Why? Because, in spite of the years of labor along the the old lines of educational work, in spite of societies for the reformation of the criminal class, in spite of societies for the protection of the better class, crime is on the increase. Like the brave knights of old, these societies have gone forth to battle with the hoary-headed ogre of crime, not realizing that this monster is fed by the lives of the young, and only by depriving him of youth will the ogre be weakened and finally overthrown. All of which means, in plain English, that an ounce of prevention is worth a pound of cure. So that now society has awakened to the fact that only by the right education of the children will reforms ever come. "The children of to-day are the men and women of to-morrow." It is the children at your knee, eagerly absorbing *your* ideas, that in a few years are the men and women whose opinions make that wonderful agent of good or evil, public opinion. The great sea of public opinion is formed by the little brooks of private opinion, which in turn are all fed from the little rills of thought that trickle down the mountain of age.

Sociologists are realizing that to have a pure society they must go back to the men and women who compose it, back to the little child. If the child's impressions, and thoughts, and plans can be kept pure and clean, society will not need many generations to become purified. If the moral standard for the boy can be kept as high as the moral standard for the girl, there will be no need to "protect" our girls. The literature, pictures and entertainments for our children must be kept up to a high ideal, if we would have our children develop into clean-minded men and women. Educators realize this as they never have before, and hence the great strides forward that have been taken by our schools in the past ten years. But the average parent does *not* realize it, and it is in just such lines as these that the Mothers' Club is bringing helpful thoughts to the parents. Our educational system has made great improvements, but it is still hampered by non-thinkers. The "perfect education is an equal development of the mental, moral and physical sides of a child's nature." We have three natures in one and each should be equally developed. What is our modern education doing in this matter? Years ago only the mental was developed, and children sat through the long hours on seats not adapted to their size or form, and almost no attention was paid to their physical development. Impure air and long hours made school destructive to the health of the growing child, and well-developed minds — or at least as well developed as minds could be in an unhealthy body — were the result, accompanied by narrow chests, pale faces and other evidences of a feeble frame. Often we welcomed our boys from college only to bury them. Now all that is changed. In nearly every school throughout the land physical culture is a part of the daily work; thermometers and ventilators keep watch upon the air and heat. All of the outdoor athletics are encouraged and time and money given for them, and, as a result, we have strong-limbed, broad-chested, ruddy-cheeked boys and girls, all of which is a right step in the right direction. With this fine physique a child can do much better mental work, and we are having the best methods possible to be obtained for their mental development. Old text-books are thrown aside and new ones that will present facts in a little clearer light are used; anything and everything that will best develop the intellect. All this is good.

Now, what is being done for the growth of the moral nature? Almost nothing. And yet there is no criminal so dangerous as an educated criminal, and they are only the fruit of an education that develops mental and physical and lets the moral lie dormant. It makes no difference whether the boy or girl comes from a palace or a hovel, if the physical and intellectual sides of their nature are developed and the moral is stunted, and narrow, and cruel. We have only educated friends, more dangerous because of their education. Thinking teachers see and deplore this lack of heart-culture and nobly try to supply the deficiency. But there should be a distinct line of heart-culture training made obligatory in our schools. The nature-studies are along this line of heart-culture, and the more these studies relate to animals the more interesting and direct in their influence are they. Let the children learn to appreciate the fact that every one of the speechless ones is blessed by its good Father with some gift far above that of humans. Let them learn to respect the animals and "consider their ways and be wise," and when we have taught them to be tender and kind to an animal, simply because it is helpless and dependent upon others, there is born in that soul a principle that will grow with their growth and strengthen with their strength; a principle that would soon depopulate our almshouses and "homes" and thereby save many a dollar to the taxpayer. Is it to be supposed that the man who sends his helpless old mother to the almshouse has suddenly become cruel? Never! That cruelty was born in his soul long years ago when the helpless little kitten was the object. "The children of to-day are the men and women of to-morrow." If, instead of trying to reform the criminal, we could spend our time and money upon preventing the children from becoming criminals, it would be beginning at the roots of crime, and kill the root and you have no tree. Our educational system is still lacking until heart-culture becomes equal with head-culture.

The Grange is a magnificent educational society. It is developing along many, many useful lines, but it is still lacking until it takes up a course of child-culture. Mothers' Clubs or Child-

Study Clubs should be organized in every Grange. What matters it if the farm is a success, if our child is a failure? The farmers' institutes are grand educational mediums, but they are not complete until they are helpful to the best development of the child-nature. The pride of the home is the child. A parent will part with all his earthly possessions to save his child. Then, why not give this dearest and best object of our homes the same careful study we give to our cows? Why not make child-study of equal importance on our institute program with fertilization? The "rotation of crops" will come and go and the money they bring be spent, but the souls of our boys and girls live on forever. Are we doing our best for them? The Grange has done wisely in urging nature-studies in our schools. Our legislators should see that there is money enough allowed for it so that every teachers' institute, even away in the back-woods, should have its speaker that would stimulate those teachers into enthusiasm that the work of heart-culture may become as real as that of physical culture. "The hand that rocks the cradle is the hand that rules the world," is quoted so often that it seems almost trite, but it is so true. No mother need think her sphere limited, for through her children she may rule the world. No teacher can estimate how much of the world's history she is making when she influences one small boy or girl.

The history of the world, the character of our dear country, depends on what kind of boys and girls we are developing. Is this child-culture a trivial thing? Think of the capabilities for nobleness, generosity, honor, sympathy, love, that lie dormant in every child's heart. In this great trend of thought the women of to-day must take the lead, and this, more than any other, is essentially woman's field. George Angell says: "Seated to-day at our school-room desks are the thieves, murderers and outlaws of the future; what are we going to do with them?" The compulsory education law brings all into the school-room. It is, perhaps, the only time in his life when the criminal's child meets on an equal footing with other children. Now is the time when a few words — one woman can change their whole after-life. Shall we not teach them love, as well as geography; kindness, as well as arithmetic, and honor, as well as music? If we can prevent criminality by education — *and we can* — let us have a practical line of work for our schools that is obligatory, *and money from the State to pay for it.* We can soon save enough from the allowances made for jails and penitentiaries to more than cover it, for an ounce of prevention costs so much less than a pound of cure.

The Farmer's Wife.

By Mrs. J. Fred Bolton.

Our president has just extended to you a most cordial welcome in behalf of the people of the village of Gouverneur. We wish to second all that he has said, and now it is my great pleasure to bring you greeting and a most hearty welcome from Gouverneur Grange No. 303, and to say that the pleasure which we feel in having you come among us we might describe as some one has described the boundaries of our continent, one being as limitless as the other, on the north by the northern lights, on the east by the Atlantic ocean, on the south by the south pole and on the west by the setting sun. In bringing you this greeting from the patrons of husbandry it is also in behalf of the farmers and farmers' wives, for it has been well said that the farmer nowadays, who does not belong to the Grange, is like the old sea captain who had been off on a long sea voyage, reaching port late Saturday night very tired. The next day being Sunday, he, of course, went to church, seating himself in one of the front pews. During the services, the captain, being very tired, fell asleep. In the pastor's discourse he asked all those that wished to go to heaven to arise. All arose but the old captain. Then the pastor said all that wished to go to ——— to arise. The captain just awaking arose and said: "Pastor, I don't just understand the question you are voting on, but it seems that you and me are in the hopeless minority," and so the farmer of to-day, out of the patrons of husbandry, is very much in the minority.

The work of a farmers' institute as usually conducted deals with the man's work on the farm. The work of the household passed over for the so-called larger and more important branches of farm industry. We ask the members of the institute force to give us a little of their time, and the benefit of their broad experience and scientific training, and help us to solve some of the problems which to-day confront the woman of the farm. We do not come to you, as some writers seem to think we should, with a long tale of woe, as beings to whom you should extend your heartfelt sympathy who work and toil, and drudge and moil. The farmer's wife of the twentieth century should resent the idea, for while work is work she does whatever falls to her lot willingly and cheerfully for the love of her family and for the love of her home. The old-time mother of the farm, as the conditions were, was said to win a crown of glory and a title of nobility which no modern American heiress can hope to buy of an *effete* European aristocracy, but the housewife of to-day is confronted with other problems in addition to these. Her work must be more along educational lines. She must know the latest and best books, the best of magazines and newspapers. She must inform herself as to the newest and best productions of our master musicians. She must hang only the choicest of pictures on her walls, for all of these are educators and assist in the making of the character of her boys and girls who are soon to form our great American citizenship.

The farmer's wife, if we may be allowed the comparison, has greater responsibility in some lines than the mother of the village or city. The benefits of reading rooms, lectures, concerts, church services, all of which are educational and elevating in character, are not as accessible to the farmer as to those of the city, and all this lack must be supplied in the home, else there will be the dividing line between city and country so prominent in years gone by, but which is now rapidly disappearing. But how are we to accomplish all of this? By constant study. For we are told that we are either going backward or forward, and forward must be our watchword if we keep abreast with the times. We cannot be like the young man in college who was an excellent sportsman, who neglected his studies by cramming for his examination, and by ways not strictly honest he managed at last to secure a diploma. He waved it above his head in the air, shouting "educated, by Jove." The farmer's wife must study also to make her house pretty and attractive, providing the comforts which each season demands, thus setting the example of the beautiful along with the true and good. Her house must be always in order. Her pantry must always be full, for she is more fortunate than her city friends. She does not have so many people who come in and go out again; who come because it is the custom or because they consider it their duty; but she has her friends, those who are willing to make the effort to drive three or five miles are always people whom she is pleased to see, and who want to see her. Of course they must stay to dinner or to supper, or both, for this is true hospitality. The woman on the farm must identify herself with some society or club, for by the interchange of thought she becomes strong and self-reliant, and in this way also makes a social position for herself and her family. The Grange is a long step in this direction. Her doors are open to all farmers' wives, and the benefits derived from attending the Grange meetings cannot be overestimated. Other societies or clubs of perhaps a more literary nature, and others still more purely social, can also be recommended as beneficial. We have thus far enumerated a few of the duties of the farmer's wife to her home, her family and herself other than the daily routine of everyday life, and now the question arises how we are to get the necessary time to do all this, as most of us know we cannot satisfactorily accomplish all of this as we are now situated. The day of the educated working woman has arrived, but an Edison, an Eads, a Krupp or some other large brained inventor or captain of industry is needed to furnish the stepping stone and make the highway broad and smooth enough to carry the weighty material we have on our hands.

The telephone, rural free mail delivery, and the trolley, are accomplished facts in many sections of the country. We may order our goods, call the physician, talk with our friends, call in or "call down" most anyone, and rapid transit brings them; but still the same question confronts us, how shall we get forty-eight hours' work accomplished in twenty-four?

We are told the age is a strenuous one, but still we want more than our empty hands to work with. The problem of domestic help has been thoroughly discussed with as yet no practical solution of the question. The tendency of the age, we are told, is toward the mills, factories, etc. This fact must be taken advantage of by the farmer's wife as well as the farmer. More machinery must be used in our work, the factory system applied to some of the heavy portions of it. Something devised whereby a specialist can make a business of some branches of our work, with appliances to turn off quickly and easily a task that employs many hands in many homes.

For example, could not a laundry be run in connection with a cheese factory; make the steam and power do double work, and thus take a good part of two days' work out of the house. We can imagine also a bakery run in this connection, although this hardly seems practical.

There is plenty of money in the hands of capitalists waiting to be invested, and here is the opportunity for a good investment. A business can be run cheaper in the country than in the city, therefore we should have special rates on whatever work is taken out of the house as well as on the manufacture of butter and cheese.

It is said that one man with the aid of his machinery can do the work of three in the field, and in many branches of work. Aside from the sewing machine, what has woman save her two hands with which to accomplish her endless number of duties, for a woman's time and attention is demanded at every turn in life.

There's not a place in earth or heaven,
There's not a task to mankind given,
There's not a blessing or a woe,
There's not a whisper, yes or no,
There's not a life or death or birth,
That has a feather's weight of worth
Without a woman in it.

The bulletin "Saving Steps," lately issued by Cornell University, contains some very good suggestions along the lines of small appliances for the kitchen, but something on a broader scale is wanted; dumb waiters and drop shelves are conveniences which we all appreciate, but the large amount of work comprised in the unending daily round is too great a matter to be handled in this way. We ask this institute force to give some thought to this matter.

We are, as Carlisle says, " Not heroic bringers of the light, but heroic seekers for it."

We hope the institute held in Gouverneur the winter of 1903 will go down in history as one in which the "woman's work" received its due consideration, and that its influence be felt from institute to institute, and that this subject be written about, talked about and discussed until results be accomplished.

AND NOW TO THE FARMER.

Of all pursuits by man invented
The farmer is the most contented;
His profit's good, his calling high,
And on his labor all rely.
By him are all mechanics fed;
Of him the merchant seeks his bread;
His hand gives meat to everything,
E'en from the beggar to the king.
Milk and honey, corn and wheat,
Are by his labors made complete;
Our clothes from him must first arise
To deck the fop or dress the wise.
Then we by vote may justly state
That farmers rank among the great,
More independent they, than all
Who dwell upon this earthly ball!
All hail! ye farmers young and old,
Push on your plows with courage bold,
Your wealth arises from your sod;
Your independence from your God.
If then the plow supports the nation
And men of rank in every station,
Let Kings to Farmers make a bow,
And every man procure a plow!

New York State Horticultural Exhibit at the Pan-American Exposition.

The most complete exhibit of fruits that has ever been made from any State or Province was the exhibit which New York State installed at the Pan-American Exposition at Buffalo in 1901. By the authority of the New York State Board of Managers, and under the direction of Messrs. S. D. Willard and F. E. Dawley, so much of value was worked out in collecting and preparing the exhibit, that instead of giving the report of the work which was done during the exposition, as it was given in addresses at the institutes, we have decided to print the entire report of the superintendent and assistant superintendent, as given to the Board of Managers. One reason why we print this in full is that the reader may have all the data and also that the list of winners and exhibitors may be put on record. The data which we have obtained in regard to the keeping quality of apples, as shown in the table, must certainly be of great value to all who are interested in apple culture.

HORTICULTURAL.

S. D. Willard, *Superintendent.*
F. E. Dawley, *Assistant Superintendent.*

In arranging for the various exhibits of the State, the horticultural department was one of the last to be considered, and the appointment of the superintendents was not made until after the greater portion of the larger growers had disposed of their crop of 1900, and the exhibit was made up almost wholly from fruit obtained from smaller orchardists and amateurs. This, however, did not detract from the quality of the fruit which we were able to procure, but it added greatly to the difficulty in obtaining it.

The apple crop of 1900 was one of the finest that New York has ever grown, and we were fortunate in being able to secure barrel after barrel of selected stock which did not have a blemish on any speciman. It was our aim in placing the exhibit, not alone to make a pretty display of fruit, but also to demonstrate that certain sections of New York State were particularly adapted to the growing of one variety while other sections were more favorable for the growing of another. Accordingly we secured specimens from every county in the State, and one of the attractions of the early days of the exhibit was the display of sixty-one plates of Baldwin apples, one from each county in the State, including New York city. The difference in form and color, as well as in quality, was decidedly marked.

We were particularly anxious to get some facts of value in relation to the keeping quality of apples from various localities, and also of the different varieties. A careful count was kept of the number of specimens which were put into cold storage, and a record kept of the number of perfect specimens which were taken out. In packing these apples, new, clean barrels were procured, and each specimen was wrapped separately in a sheet of waxed paper, 12 x 12 inches. Care was taken to press the paper tightly to the apple, excluding the air as much as possible. In a few instances tissue paper was experimented with, first wrapping the apple in this and then covering with waxed paper, and in other cases using the waxed paper next to the fruit with the tissue paper on the outside. No advantage was noted from either of these wrappings, and in some instances the tissue paper on the outside of the waxed seemed to be a positive damage, as it seemed to hold the moisture when the apples "sweat." In some cases the apples were too ripe when packed, owing to the lateness of our getting at the work, and these did not keep as well as those which were at just the proper stage when packed. In one case an entire shipment of apples decayed very badly. Investigation proved that the grower had let them stand in the orchard over Sunday, after packing and before shipping. As the weather was somewhat warm they became pretty thoroughly heated.

The fruit was all stored in the Buffalo Cold Storage Company's establishment, and the temperature did not vary much from thirty-four degrees from the time the fruit was received by them until it was taken out and placed upon the exhibition tables.

In referring to the keeping qualities of the different varieties, it is essential that you know that all the varieties taken into consideration were wrapped and packed in the same way, kept in the same temperature and treated in all respects exactly alike. The fruit which was experimented with by different systems of wrapping and packing were not taken into consideration, and a few barrels, for a check, were placed in cold storage without any wrapping, Baldwins and Ben Davis being selected for the test. They were placed in the same storage rooms and received the same treatment as others. Up to May first they kept in remarkably good condition, but after that they lost flavor and color, and began to speck badly. Of these at least twenty-five per cent. were in bad condition on May twentieth. Those that were well wrapped in the waxed paper, making practically an air-tight compartment for each specimen (which not only preserves the apple from outside influences, but which prevents the germs of decay spreading from one specimen to another), were found in fine condition as late as November first. Reference to the accompanying table shows you that the Ben Davis, Gano, Red Romanite, Russets, Cooper's Market, Boiken and Bethel were among the best keepers.

When our exhibit was placed, on May twentieth, we found barrel after barrel of Northern Spy, Baldwin, Newtown Pippin, Jonathan and Fameuse in which the loss was less than one per cent. One barrel of Newtown Pippins which were placed at this time contained but one apple which was not fit to go upon the tables, and the last of this particular lot was not removed from the tables until sixty days afterward. On October thirtieth, when the exhibit was removed we had twelve specimens of Ben Davis and two of Gano which were taken from the barrel and placed on exhibition May nineteenth. Of course, they were badly shrivelled and discolored, but they had not decayed, and some of them on being broken open were as white as cotton inside.

In compiling the table I have arranged a scale of points for keeping quality, marking the apples which were found in perfect condition, or as nearly perfect as you could expect, 100. The marking on those which were decayed, discolored or damaged in any way has been reduced accordingly. These markings were made when the apples were taken from cold storage, and shows the comparative condition of the various sorts at the date mentioned.

Table showing per cent. of selected apples that were fit for exhibition as they came from cold storage on different dates:

VARIETIES.	May 20.	June 20.	July 20.	Aug. 20.	Sept. 20.	Oct. 19.
Ben Davis	99	99	99	98	97	97
Gano	99	99	99	99	98	98
Baldwin	98	97	97	97	96	95
Esopus Spitzenburg (Schoharie valley)	99	99	98	98	97	97
Esopus Spitzenburg (Western New York)	97	97	97	96	96	95
Rhode Island Greening	94	91	90	90	83	81
Northern Spy (grown in sod)	97	97	96	95	90	83
Northern Spy (cultivated land)	93	90	89	89	81	73
Boiken	98	98	98	97	96	95
Bethel	98	98	98	97	96	95
Cooper's Market	97	97	96	95	93	91
King	94	90	84	81	74	71
Wagner	61	58	51	50	41	33
Jonathan	94	94	94	93	92	90
Fameuse	95	94	94	93	90	90
Rome Beauty	90	90	90	90	87	85
McIntosh Red	90	88	88	88	85	85
Canada Red	94	94	94	94	90	90
Russet	99	97	95	93	80	80

While the table covers but a very few of the varieties which were on exhibition, we had small packages and parts of packages of many other varieties that are not so commonly grown, and which kept as well as the best. One barrel of Yellow Bellflower, which is a very tender apple, and which is ordinarily gone by February first, came out May twentieth with a loss of but four per cent., and the more perfect specimens remained on the tables something over two weeks. The Wagner was very disappointing, scalding worse than any other variety, and coming down very quickly when exposed to the air.

Among the newer varieties which were exhibited, the Boiken proved to be one of the best keepers, holding its own remarkably well in cold storage and making a fine appearance on the tables. The Gano also attracted considerable attention; it kept as well as the Ben Davis, and being darker in color was more attractive. Many growers seem to think the Gano and Ben Davis are identical. While the trees are practically alike in growth, and it is almost impossible to tell the varieties apart when green, a careful examination of the specimens in our exhibit demonstrated clearly that as grown in New York under similar conditions there is a decided difference in the two varieties. The Gano being redder, with less stripes, and averaging a trifle less in size, more free from russet, and in the opinion of a majority of those who tested them side by side, more juicy, and with a little more flavor.

Our exhibit of cold storage apples grown in 1900 contained 345 varieties, comprising 4,000 plates. Samples of each of these were on the tables May twentieth, all correctly named, with labels bearing the name of the grower and the county in which they were grown. No other exhibit approximated our cold storage display in varieties nor quality. In the entire exhibit it was impossible to find an apple with a blemish. This display was made continuous until November second, being gradually diminished in extent to make room for fresh fruits as they came on, and on it we were awarded a gold medal.

Our exhibit of pears grown in 1900 comprised twenty-one varieties. While many more were put in cold storage, they were so ripe at the time they were packed that upon opening them they were not in good condition. Had the horticultural building been ready for us on May first, we could have shown at least twenty more varieties. The keeping quality of the Winter Nellis and Kieffer was again demonstrated, as some of them were shown as late as August.

We were also able to place on exhibition seven varieties of quinces and five varieties of grapes, and were awarded a gold medal on this general display of pomaceous fruits grown in 1900. It is to be regretted that we were not allowed to make a larger collection of grapes grown in 1900, as the varieties which we did have in cold storage, prepared as we directed, came out in particularly good condition. The Vergennes and Diana were in a fine state of preservation and made a beautiful display. The exhibit of Catawbas was particularly good, with hardly a defective berry on any of the clusters. We had but 100 pounds of these, and were able to keep up a continuous exhibit from the time of opening until July tenth. The grower, Mr. J. S. Smith, was awarded a silver medal for the exhibit.

A fact of great practical value, to the apple growers of New York State, is brought out by experiments in handling this cold storage fruit, and that is that the season can be greatly prolonged by proper packing and placing in cold storage well grown specimens of many varieties of apples, pears and grapes, and that great profit can be derived from so doing. Apples which cost us but three dollars per barrel in the fall could have been sold at the time we placed them on exhibition for from six dollars to ten dollars per barrel. We were offered thirty cents per pound, for all the Catawba grapes which we had, soon after the first plates were placed on exhibition. Small packages of other apples and pears put up for family use would have brought almost fabulous prices.

In apples the varieties most suited for this trade would seem to be Spitzenburg, Fameuse, Jonathan, Boiken and Baldwin. There is a wide field open for progressive growers in this direction, and as we have demonstrated that the difficulties can be overcome by following the methods which were used in packing this exhibit, we expect many growers will take advantage of it. Reference to the list of awards at the close of this report will show that many gold, silver and bronze medals were awarded the New York State growers for their exhibits.

We were the first to place on exhibition apples grown in 1901, putting some elegant specimens of Yellow Transparent and Early Harvest on the tables June twelfth. These were grown under glass at Cornell University, and exhibited in the University's general exhibit. The finest specimens of *Cerimin Monstera Deliciosa,* grown under glass, which were shown at the exposition were also found in the Cornell exhibit.

STRAWBERRIES.

Our collective exhibit of strawberries, on which we received a gold medal, extended from June twenty-third to October thirty-first. It covered something over 180 varieties, shown by sixty-three different exhibitors. The most attractive exhibit which we were able to make was on June twenty-ninth, when we had over 700 plates of Marshalls on exhibition, and 1,200 plates of other varieties. The Marshall berries are very dark in color, large in size and of exquisite flavor. They demand the highest cultivation, and in sections where they do well are among the finest for home use. This exhibit was shipped to us from growers in all parts of the State, and was pronounced by our competitors to be the finest strawberry show they had ever seen.

The largest exhibit of different varieties of strawberries was made by the New York Agricultural Experiment Station, of Geneva. The largest individual exhibit was made by Mr. Wm. Palmer, of Grooms, who contributed seventy-one varieties. Although grown in the eastern part of the State they were received in perfect condition, which is surprising, when you take into consideration that in so large a collection there are many varieties which are regarded as not being of good shipping quality. Nearly all market strawberries are shipped in ventilated crates, but those which came to us in tight packages were received in the best condition, and the fruit sent in this way remained in good condition longer when displayed than the other. Such varieties as the Sharpless, Carrie and Gandy held up from six to eight days after being displayed, and drying up rather than decaying.

The exhibit of the Pan-American strawberry, made by Mr. Samuel Cooper, of Delavan, was remarkable. From July eighteenth until November second Mr. Cooper kept a continuous display of his new seedling strawberry on our tables. The quality of the fruit is very good, resembling the Bismarck somewhat, but the fact of its continuous bearing throughout the summer is wonderful.

Mr. G. E. Ryckman, of Brocton, also exhibited a very fine new seedling, showing both the fruit and the growing plants. The growth is very strong. The fruit is of good color and extra large size, and remarkably good in quality. Another seedling of merit was the Corsican, shown by Mr. Charles A. Green, of Rochester.

GOOSEBERRIES.

Our display of gooseberries was a revelation to many of our own citizens. Because of mildew and other difficulties this is a fruit which is not very largely grown, and as it is seldom found in market people lose sight of it. When properly prepared for table use it is one of our finest summer fruits. Those who have partaken of none of the new, sweeter, highly delightful acid varieties have but little conception of its value. The rapid strides which have been made in scientific fruit culture has enabled growers to successfully combat with mildew and blights, which makes the culture of the finer English varieties unprofitable. Growers who begin early in the season to spray their bushes thoroughly and continuously with sulphide of potassium, and who understand that the soil needs to be shady and kept cool, are growing this fruit to perfection. The demand for gooseberries is rapidly increasing, and it might well take the place of the cranberry in making jellies to be served with meats, game and fowl. The extent to which this fruit is being grown can be judged from the fact that at one time we were able to show 139 named varieties. The largest exhibit of gooseberries was made by the New York Agricultural Experiment Station, of Geneva, consisting of 128 varieties.

CURRANTS.

Our exhibit of currants comprised something over 9,000 plates and sixty varieties, continuing for forty-three days. The first to be exhibited were Fays' Prolific, White Grape and Cherry. A number of new seedlings were shown, on which medals were awarded to the propagators. Among the finest were the Perfection, exhibited by C. G. Hooker, of Rochester; the Diploma, exhibited by Mr. Jacob Moore, Vine Valley, and the Chautauqua Climbing, exhibited by E. H. Fay & Son, Portland. One of the finest varieties which was exhibited was the White Imperial. A continuous display was maintained for twenty-eight days, showing that this is a currant of long season, and careful tests proved it to be of the finest table quality. The President Wilder also attracted much attention.

RASPBERRIES.

Of this popular fruit we had a magnificent exhibit, extending from July third to August twenty-second. Many new varieties were placed on exhibition. The display of Columbian, Ohio, Gregg, Palmer and Kansas indicated that these are among the most profitable and popular varieties in the black caps. Of the red varieties we had a large and beautiful display. Our exhibit of blackberries, dewberries and huckleberries comprised every variety grown in the State, and indicates the wide range of our possibilities as a fruit-growing section.

APRICOTS AND NECTARINES.

On June twenty-ninth a fine exhibit of nectarines, comprising four varieties, was shown by Cornell University. It is to be regretted that this fruit is such a difficult one to grow, as its beauty and quality would soon make it a most popular sort. The samples which we had on exhibition attracted a great deal of attention, as it was entirely new to many people.

The apricot is a native of Central Asia, and the perfection with which it can be grown on the soils of New York State simply demonstrates the vast number of varieties of fruits which we can produce. The samples shown from the various counties in central and western New York comprised the following varieties: Acme, Nicholas, Shenoe, Catharine, Cluster, Alexander, Large Early, Montgamet, Moorpark, Jackson, Roman, Golden Russian and Gibbs.

PLUMS.

The soil and climatic conditions of central New York and the Hudson river valley, as well as the grape belt along the line of Lake Erie and Lake Ontario, makes an ideal situation for plum growing. While this fruit is not adapted to all sorts of soils there are hundreds of acres in New York upon which it can be grown profitably. Our large cities and thickly populated manufacturing sections make a fine market for this popular fruit, and it is cultivated by many. While the summer of 1901 was not an ideal one for profitable plum culture, we were able to make a very good exhibit, extending from July twentieth to October seventeenth. The great multitude of varieties extends the marketing season so that it is one of the most profitable fruits, in sections where it is adapted. The attractive Japanese varieties, which are so easily grown, made a most showy exhibit. The display of prunes and English varieties, with their bright green, yellow and blue coloring, made the plum display one of the most beautiful of the season. The first variety to be shown was the Wild Goose, and among the last ones on the tables were the Copper, Warner's Late Red, Wayland, Damson and Grand Duke.

PEACHES.

From August first to November first on our tables were found the finest collections of peaches that were shown in the Horticultural Building. While the peach is a native of Persia, and delights in a warm climate, some of the finest flavored peaches which are grown in the world are produced on Long Island, in the Hudson river valley, and in central and western New York. While we have had some trouble in peach growing, in the way of yellows, borers, and other difficulties, it is one of the most profitable fruits our producers grow. We hear much about the large crops in other States, still a large portion of all that finds its way to our New York markets is home grown. Our displays demonstrated clearly that no finer peaches are grown anywhere than in New York State.

VITICULTURE.

Very few people realize the extent of New York State's grape-growing industry. So nearly as can be ascertained the vineyard area in the Chautauqua grape belt comprises over 25,000 acres. The Central New York lake region has an acreage of not less than 20,000 acres, divided as follows: In the vicinity of Canandaigua lake, 6,000 acres; in the vicinity of Keuka lake, 7,000 acres; in the vicinity of Cayuga lake, 2,000 acres; in the vicinity of Seneca lake, 5,000 acres. In Niagara and Orleans counties there are about 2,000 acres, and in Onondaga and Oswego counties about 1,000 acres. In the Hudson river valley there are about 15,000 acres, and in isolated vineyards in other parts of the State there are probably 1,000 acres, making the total acreage for the State about 65,000.

The aggregate sales of grapes over the State this year, independent of those sold to wine makers, will not be less than 110,000 tons. From official sources we learn that shipments in carload lots from twenty-nine leading stations in the Chautauqua grape belt in 1899 amounted to 6,977 cars. Each car consists of about 3,000 eight-pound baskets, or from twelve to twelve and a half tons of fruit. From all the data which can be obtained it is evident that the grape crop of New York State brings more money to the grower than does that of California. Very few people seem to realize that New York State is far in the lead as a grape-growing, as well as an apple-growing, State, and in preparing our exhibit we were particularly anxious to demonstrate the State's prominence as a grape-growing section.

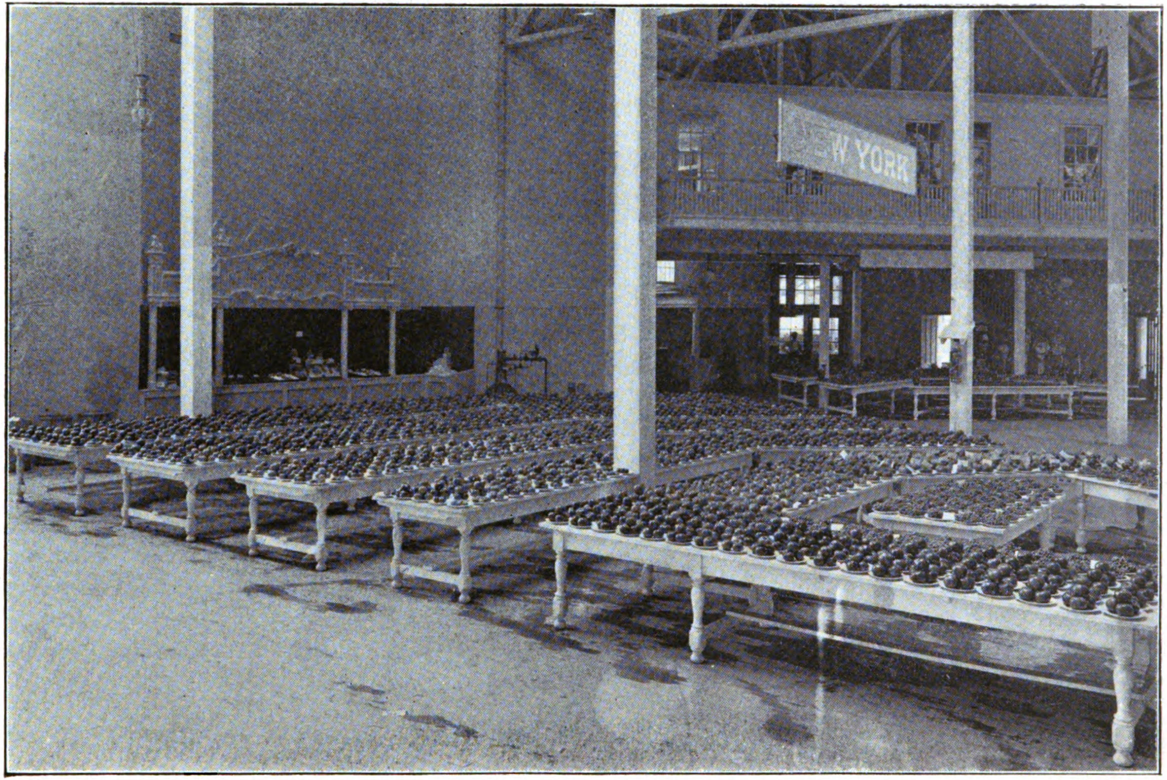
Our first exhibit was received on August 18th and consisted of three varieties. Shipments came in rapidly from that time until September 1st, and on many occasions we had more than 2,000 plates of grapes on the tables at one time. During the month of September an average of 1,200 plates of grapes was kept on the tables, and during October the average was 1,800 plates.

The largest cluster of grapes exhibited during the exposition from any State was shown by Mr. D. M. Dunning, of Auburn, and weighed eight pounds nine ounces. It was grown under glass, and is shown in the center of the plaque in one of the accompanying illustrations.

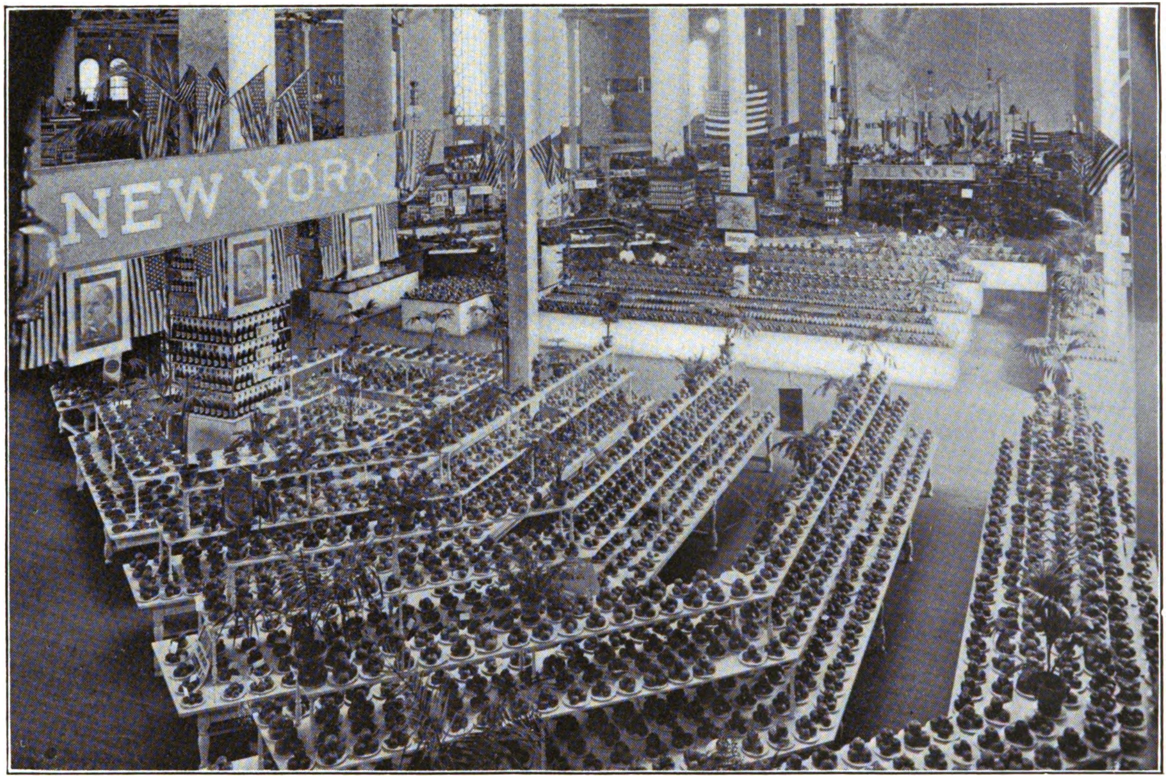
A large number of very fine new seedling grapes were shown. The best seedling, by all odds, that was shown was produced at the New York Agricultural Experiment Station, and is known as seedling No. 797. It is the finest of the hybrids that have been brought out under Prof. Beach's experiments, and should find a place in every collection as soon as it is disseminated. It grows very compact in the cluster, is of fair size and is very rich and sweet. The Charlton, shown by Mr. John Charlton, of Rochester, and some of Mr. Moore's seedlings were also of very superior quality.

It may be interesting to know that in the grape exhibits New York received more awards than all the rest of the States together, and exhibited four times as many varieties as any other State.

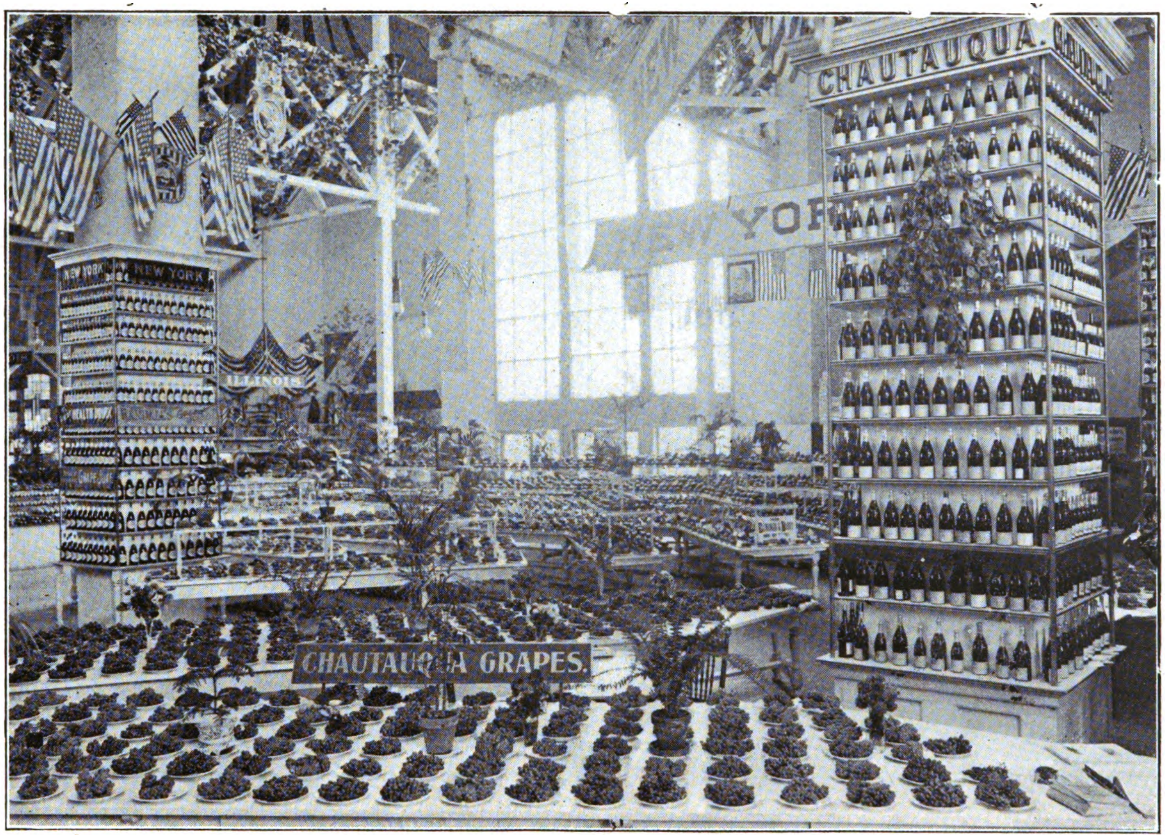
"When it comes to apples New York is the leader."



No. 1. Display of cold storage fruits on the opening day of the exposition.

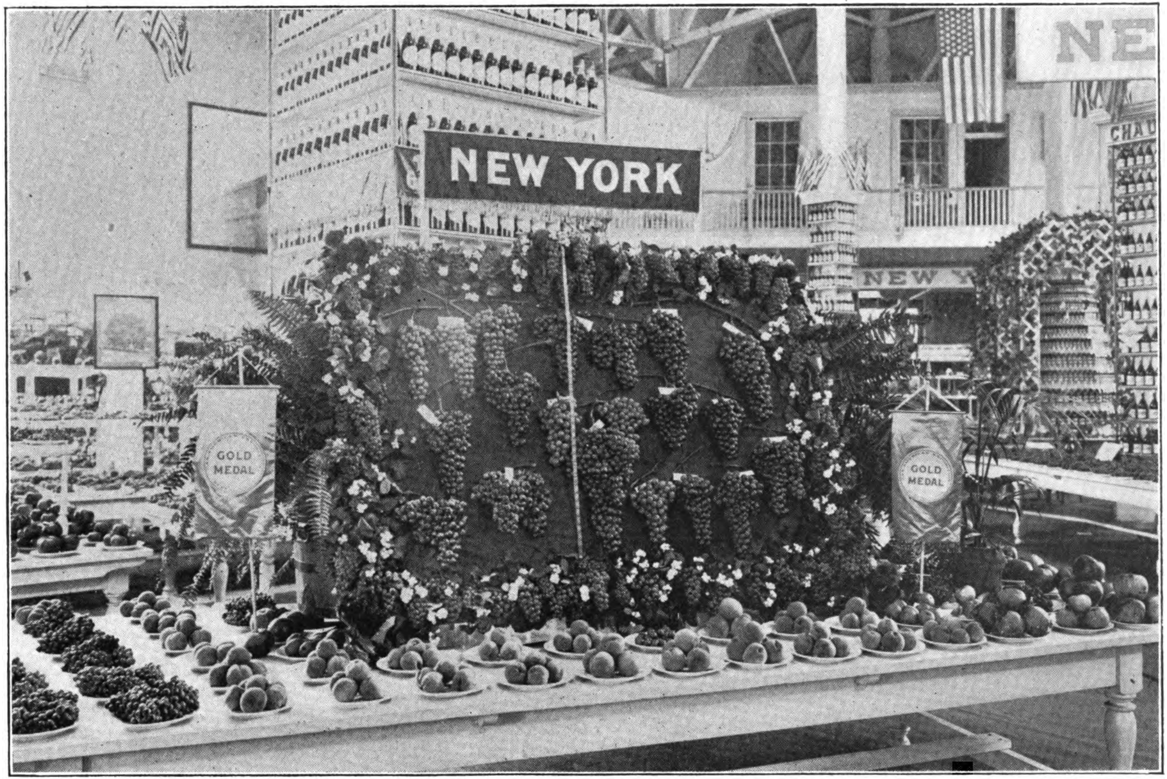


No. 2. One section of New York State's apple exhibit as seen on New York Day.

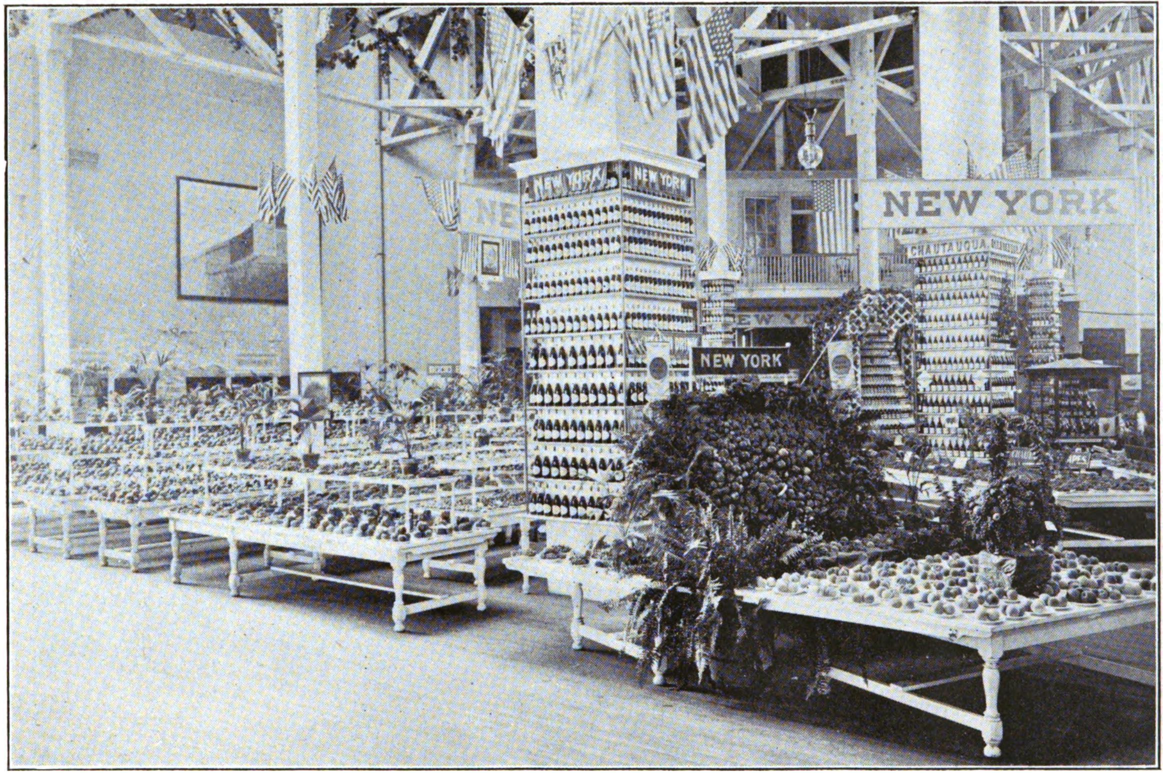


No. 3. Grape and wine exhibit from Chautauqua county.

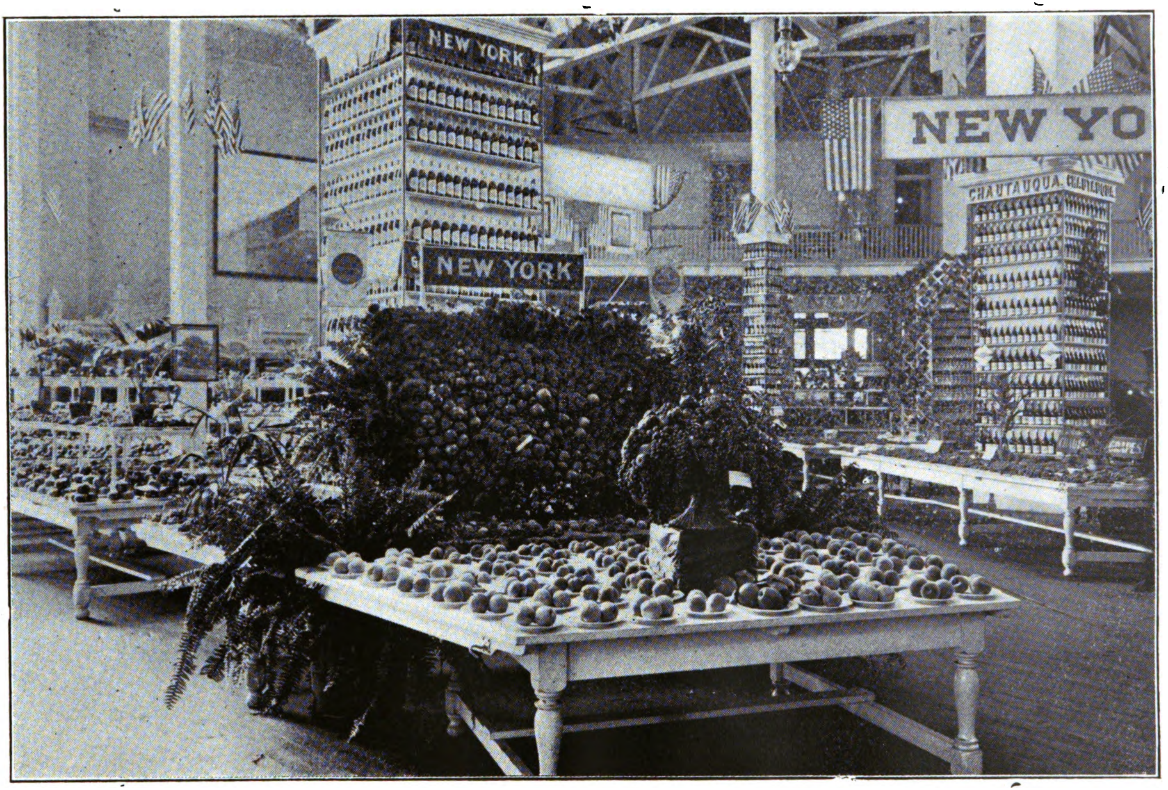
No. 4. Some of the grapes before they started for Buffalo.



No. 5. Exhibit of hot-house grapes grown by Hon. D. M. Dunning of Auburn.



No. 6. General view of the exhibit October 15th.



No. 7. One of the "living pictures" designed by the assistant superintendant and executed by Mr. Julius Henreich.

While but little space was reserved for wine exhibits New York's exhibit was larger than any other, excepting California, and each of our exhibitors received an award.

APPLES GROWN IN 1901.

Had our competitors arranged conditions, we could not have been more seriously handicapped in attempting to make an apple exhibit than we were this season. Official figures show that the apple crop of New York State was less than eighteen per cent of an average crop, and while the fruit grown in 1900, which we exhibited, contained no blemishes, it was hard work to find enough perfect specimens of the crop of 1901 to make a first-class plate. We were not able to secure as many varieties of winter fruit as we had in cold storage of the season before, because many sorts did not bear at all. However, our samples came from a wide range of territory, and in a few isolated orchards we were able to get fine specimens. Even with these unfavorable conditions we were successful in winning more awards than any of our competitors, and with the samples of cold storage fruit which remained on our tables throughout the fall we were able to impress upon dealers that New York State still maintained, with ease, its position as an apple-growing section.

Many people have an idea that exhibits of this character are of but little practical value to the State. Could they have seen the eagerness with which apple buyers and cold storage operators watched the various shipments as they came in, taking note of the quality and the section in which the fruit was grown, this notion would have been dispelled, and, I believe fully, that the increased prices which producers of apples alone received for their 1901 crop, because of the samples which were exhibited, would more than pay the cost of the State's horticultural exhibits at the exposition.

Among the newer varieties of fruit shown some of the most beautiful were the Bismarck, Stark, Boiken and Haas. Many varieties which are not usually grown and which seem to possess superior merit were shown, among them being the Gano, Canada Red and Cooper's Market. While the varieties of apples have been multiplied almost without number, it is still a fact that those which seem best adapted to market culture can be named on the ten fingers, and it will be many years before the Baldwin, Northern Spy, Greening, Hubbardston, Spitzenburg, Russet, King and Ben Davis are crowded out. While many people have an idea that the Ben Davis as grown in the West is a better apple than when grown in New York, it is a fact that the finest colored specimens and those which kept the longest during the exposition were grown on New York State soil. The Rome Beauty attracted considerable attention at the exposition, and the growers who have tried it speak in the highest terms of its fruitfulness and its ability to resist wind.

The entire season's work with apples demonstrated clearly that, while thousands of acres may be set in the west, New York has but little to fear from that competition. New Mexico and Oregon exhibited particularly fine specimens of fruit, and, while contrary to the general belief in the East, they were of good flavor, operations must be carried on there on a large scale to be profitable, and they do not get the fine texture and keeping quality in their fruit which is manifested in ours.

QUINCES.

Our quince exhibit, grown in 1901, was fine, and the wide range of varieties shown and the large number of exhibitors making the display indicated that this fruit is receiving more attention.

One of the greatest attractions in the horticultural building were our plaques of fruit, which were five feet high and six feet wide. The first one set up represented spring, the second summer and the third one autumn. In these designs over 1,000 pounds of fruit were used, and not a blemish in the lot. It was at its best on New York Day and was admired by thousands. Prince Ito, of Japan, said it was the most magnificent work of the kind he had ever seen, and requested that a photograph of it be sent to him. The designs of the other States did not approach these elaborate pictures. Another feature of our exhibit was the baskets of the finest fruits, which were maintained from August 1st to the close of the exposition, which we varied from day to day, sometimes filling the baskets with grapes and at other times with peaches, plums or apples. While this display was most carefully studied by those most interested in fruit, and was many times studied whole days by young men and growers, it also attracted the attention of the general public, and impressed them with the beauty and quality of New York State's fruit. The plan of color and association of form in these designs entitled them to be styled works of art. They were designed by Mr. F. E. Dawley and executed by Mr. Julius Heinrich.

The especial thanks of the management of the Horticultural Department are due to the Director of the New York Agricultural Experiment Station at Geneva, who did so much to make our exhibit a success; to Prof. S. A. Beach, horticulturist at the Station, and to his assistants for their careful packing and labeling of the various sorts of fruit which they contributed to the exhibit. Many of these sorts are new, or but little known, and it would have been impossible for us to name them. Our thanks are also due to Dr. I. P. Roberts, Prof. L. H. Bailey and Mr. G. E. Hunn, of Cornell University, for the fine exhibits which they maintained, and especially for the specimens of hot-house green apples and semi-tropical fruits. The section of our space which was occupied by the Chautauqua Fruit and Wine Association was kept well filled with a fine display of Chautauqua county's superior horticultural products, and the president of this Association, Mr. G. E. Ryckman, and the secretary, Mr. S. S. Crissey, are entitled to much praise for their assistance. Our New York State exhibit was recognized by all the exhibitors in the building as a strictly educational exhibit. Nothing was placed on our tables unless it was carefully named. We wish to thank Prof. H. E. Van Deman for his uniform courtesy and assistance in correctly naming disputed varieties. It is a source of gratification to us that the New York exhibit received more gold medals than any three competitors, and that while we received forty-nine awards of gold medals, the next highest competitor, the Province of Ontario, received eighteen, and the next highest State twelve.

The list of awards is as follows:

CATALOGUE OF EXHIBITORS IN THE NEW YORK HORTICULTURAL DEPARTMENT.

Avery, S. M., Fredonia.
Aiken, Wm., Geneseo.
Allnatt & Bliss, Fredonia.
Allis, Jay E., Medina.
Able, C. K., Dunkirk.
Arnold, L. G., Benton Centre.
Arnold, Mrs. G. H., Bentley.
Allen, James, Middleport.
Aldrich, George, Silver Creek.
Bloomingdale, Fay, Alabama.
Burghdough, S. E., Lyons.
Broad, Chas., Jeddo.
Brown, Miss Ella, Portland.
Button, E., Fredonia.
Bonquin, C. L., Laona.
Bond, F., North Boston.
Babcock, W. H., Fredonia.
Belden, S. P., East Williamson.
Burdick, J. D., Fredonia.
Benjamin, Wm. F., Fredonia.
Beckwith & McLean.
Bliss, D. G., Fredonia.
Barnes, E. A., Lockport.
Bell, Levi, Sparkill.
Brown, J. G. O., Wilson.
Bradley, G. H. & Son, Lake Road.
Babcock, L. R., Spencerport.
Baker, Chas. N., Selkirk.
Babcock, L. B., Fulton.
Bassett, W. A., Farmer.
Breese, H. G., & Son, Hoosick.
Brainard, L. G., Ellington.
Borden, Wm. H., Halls Corners.
Beattie, Herbert, Halls Corners.
Bennett, James T., Eagle Harbor.
Beal & Son, Victor.
Bowman, A., Hartland.
Breathe, Herbert, Stanley.
Baggerly, B. W., Clifton Springs.
Bassett, W. A., Farmer.
Butcher, R., Fredonia.
Betts, J. W., Ripley.
Barnes, W. D., & Sons, Middlehope.
Birdseye & Son, Stanley.
Brown, Geo. H., Williamsport.
Colvin, E. L., Fredonia.
Clothier, F. B., Silver Creek.
Cowden, L. E., Fredonia.
Couchman, G. W., Fredonia.
Cole, Mrs. E. A., Fredonia.
Crissey, S. S., Fredonia.
Cato, P. G., Fredonia.
Colvin, E. L., Fredonia.
Coon, Alexander, Medina.
Cornell University, Ithaca.
Coughtry, J. W., New Scotland.
Crosby, I. N., Pekin.
Cook, M. N., South Byron.
Crosby, Fred, Crosby.
Condit, A. C., Geneva.
Cooper, Wm., Seneca Castle.
Collamer, J. B., & Son, Hilton.
Cross, F. N., Poughkeepsie.
Clark, Fred W., La Grange.
Chase, Geo. S., Hector.
Crozier, J. W., Halls Corners.
Cronin, J. W., Halls Corners.
Crofut, F. H., Le Roy.
Cave, P. J., Fredonia.
Cushman, Mason, Silver Creek.
Cranston, A. B., Sheridan.
Costello, T., Benton Centre.
Coleman, M., & Son, Canandaigua.
Darrow, C. H., Geneva.
Dotshome Dairy Farm, Fayetteville.
Dawley, F. E., Fayetteville.
Duncan, Chas., Appleton.
Dailey, S. C., Wilson.
Dufloo, Wm., Sodus.
Dunlop, Robert W., Fayetteville.
Dumas, George O., Fulton.
Davis, D. A. A., Westfield.
Davis, Mrs. George, Lancaster.
Davis, S. DeLos, Barker.
Day, C. M., Geneva.
Dodge, U. E., Fredonia.
Dunning, D. M., Auburn.
Douglas, George B., Dunkirk.
Denton, E. O., Somerset.
Dutton, A. H., Youngstown.
Dunn, George W., Webster.
Darrow, C. H., & Co., Geneva.

Davis, George, Mexico.
Day & Hall, Fredonia.
Dunckley, H. D., Fredonia.
DeWitt, J. M., Fredonia.
Downer, H. E., Forestville.
Ellwanger & Barry, Rochester.
Ells, G. D., Schuyler Falls.
Eastman, W. L., Ovid.
Edmunds, C., Dunkirk.
Eighme, A. G., Lockport.
Edict, S., Olcott.
Farmer, L. J., Pulaski.
Fay, E. H., & Son, Portland.
Ferguson Bros., Voorheesville.
Fairchild, Lewis C., Bath.
Fellows, Henry C., South Onondaga.
Fuller, J. B., Holly.
Foote, A. W., West Somerset.
Foster, W. L., Canandaigua.
Freer, W. H., Canandaigua.
Fay, O. N., Portland.
Foster, H. C., Canandaigua.
Fuller, George W., Portland.
Greens Nursery Co., Rochester.
Gouinlouck, H. J., Fredonia.
Genns, Wm. D., Laona.
Green, C., Fredonia.
Green, C. A., Rochester.
Goodwin, Frank, Portland.
Greenfield, J. M., Buffalo.
Griffin, A. W., Hartland.
Guest, Elbert A. Fredonia.
Garbutt, J. B., Barker.
Gregory, Chas. P., Stanley.
Gates, Elias, Coxsackie.
Giles, Frank, Sheridan.
Griffin, N. G., Canandaigua.
Gibbons, P. T., Sheridan.
Houck, James A., New Scotland.
Hill, Fred W., Adams Basin.
Hunt, G. E. & H. S., Fredonia
Hooper, E. J., Fredonia.
Hand, J. W., East Hampton.
Houseman, G. A., Carlyou..
Hart, E. T., Fredonia.
Hubbard, T. S., Co., Fredonia.
Hamler, E. E., Sheridan.
Hart & Scott, Penn Yan.
Hadden, J. B., Poulteney.
Hixon, P. V., Appleton.
Hitchings, Grant G., South Onondaga.
Harkness, J. W., Harkness.
Hardin, N. W., Kinderhook.
Howes, A. B., Canaan.
Hunn, G. E., Ithaca.
Hubbard, M. N., Fredonia.
Hale, Wm. H., Fayetteville.
Hooker, C. G., Rochester.
Hepworth, J. A., Marlboro.
Houston, Mrs. J. H., Florida.
Hulbert, J. A., South Onondaga.
Hart, Wm. H., Poughkeepsie.
Inslie, J. P., Clifton Springs.
Jennings, C. W., Belleville.
Johnson, Mrs H. A., Fredonia.
Jarvis, Ira S., Hartwick Seminary.
Jaarda, G., Fredonia.
Josselyn, George S., Fredonia.
Johnson, Mrs. S. N., Canandaigua.
Keene, C., Syracuse.
Knapp, Lee, Seneca Castle.
Kramer, Clark H., Hartland.
King, H. U., Clifton Springs.
Kearney, W. E., Medina.
King & Robinson, Trumansburg.
Kusniski, Andrew, Fredonia.
Knight, F. E., Portland.
Kinner, George W., Fredonia.
Kitchem, W. J., Wrights Corners.
Lewis, J. N., & Son, Annandale.
Lown, J. M., Penn Yan.
Lidzy, David, Selkirk.
Loucks, G., Scriba.
Lewis, H. B., Fredonia.
Lambkin, Wm. M., Lamberton.
Letson, J. E., Laona.
Lutts, Henry, & Son, Youngstown.
Losee, Mrs., Fredonia.
Lincoln, O. M., Newark.
Lewis, R. N., Annandale.
Laur, A. R., Niagara.
Lewis, Mrs. Chas., Flint.
Lewis, C. W., Penn Yan.
Luther, R. D., Fredonia.
Lockwood, J. O., Olcott.
Lutts, Henry, Youngstown.
Main, Prescott D., Clockville.
Mann, Charles, Breakabeen.
Meicklejohn, A. G., Putnam Station.
Morse, G. F., Schuyler Falls.

Mixer, F. L., Fair Haven.
Maxwell, T. C., Geneva.
Moore, Jacob, Vine Valley.
Mead, W. B., Portland.
Marks, George, Canandaigua.
Mann, W. T., Barker.
Miller, E. S., Germantown.
Moffett, Wm., Stanley.
Merrill, E. C., Geneva.
Murphy, J. E., Clockville.
Miller, H. M., Barry Centre.
Miner, H. G., Sheridan.
Miller, Mrs. Charles, Geneva.
Maxwell Bros., Geneva.
Marsh, George W., Fredonia.
Mudge, W. S., Hartland.
Miller, George, Bristol Springs.
Marsh, E. N., Fredonia.
Morgan, H. F., Fredonia.
Martin, Jonas, Brocton.
Magee, Hugh M., Groveland.
McFarlane, David, Scarborough.
McCollum, S. W., Lockport.
McNamara, S. S., Graham.
McCollum, J. B., Hilton.
McClew, E. J., Newfane.
McNair, H. B., Dansville.
McKay, W. L., Geneva.
New York Agricultural Experiment Station, Geneva.
New York State Board of Managers, Buffalo.
New York State Fruit Growers' Association, L. T. Yeomans, President, Walworth.
Nichols, Calvin, Willink.
Nickerson, J. K., Oaks Corners.
Norton, F., Jeddo.
Nellis, H. J., Stanley.
Nellis, George R., Clarkson.
Ontario County Fruit Growers' Association, S. D. Willard, Geneva.
Onondaga County Fruit Growers' Association, C. M. Peck, Fayetteville.
Odd Fellows Home, G. W. Haynes, Supt., Lockport.
Outwater, Wm. H., Olcott.
Paschke, R. J., Fredonia.
Palmer, William, Grooms.
Pierson, M. F., Stanley.
Pillow, W. H., Canandaigua.
Powell, George H., Ghent.
Phelps, A. M., Stanley.
Perkins, Mrs. G. H., Rochester.
Presler, R. J., Fergusons.
Purdy, W. H., Fredonia.
Putnam, J. A., & Son, Fredonia.
Porter, H. J., Fredonia.
Pettit, George W., Fredonia.
Patterson, L. C., Sheridan.
Pettit, Henry, Portland.
Putnam & Worden, Fayetteville.
Patterson, J. G., Sheridan.
Prish, D. L., Middleport.
Palmer, O. C., Union Hill.
Peterson, H., Fredonia.
Parker, L. T., Laona.
Powers, J. A., Portland.
Rose, J. F., Coxsackie.
Rose, Wheeler, Syracuse.
Robertson, Wm. H., Ferguson's Corners.
Rhind, Duncan, Canandaigua.
Robertson, C. C., Ransomville.
Reisinger, A., Naples.
Reynolds, J. A., Ontario.
Ryckman, Lawrence, Brocton.
Roberts, J. T., Syracuse.
Raming, Chris., McNeils Corners.
Reeves, F. L., Palmyra.
Race, F. B., Weedsport.
Roesch, Lewis, Fredonia.
Ryckman, E. G., Brocton.
Ryckman, E. G., & Son, Brocton.
Rickenbrode, F. W., Ripley.
Ring, Dr. A. C., Appleton.
Roth, William, Fredonia.
Roberts, W. Henry, Syracuse.
Ring, William, Orleans.
Reeves, M. F., Orleans.
Rowley, E. A., Albion.
Strong, C. A., Buffalo.
Simmons, George, Geneva.
Smith, Edward C., Gasport.
Smith, E. Lyman, Wellsboro.
Stone, H. M., Rock Stream.
Smith, E. L., Mexico.
Steadman, C. W., Warrens Corners.
Stebbins, I. N., Albion.
Shafer, W. A., Oneonta.

Stacy, G. H., Syracuse.
Strangher, L. C., Geneva.
Spencer, J. W., Westfield.
Stone Bros., Scriba.
Smith, Stephen, Oaks Corners.
Smith, L. E., Geneva.
Smith, S. A., Stanley.
Scott, W. A., Sheridan.
Stebbins, W. K., Sheridan.
Swan, John, Vine Valley.
Schifferli, H. C., Sheridan.
Smith, Henry, Fredonia.
Smith, W. S., Portland.
Skinner, E. W., Portland.
Semon, George S., Spencerport.
Seneca County Fruit Growers, W. L. Eastman, Ovid.
Shaver, S. C., Cobleskill.
Stearns, C. L., North Syracuse.
Smith, E. L., Willsboro.
Smith, W. I., Hilton.
Syace, S., Charlotte.
Snyder, F. H., Ghent.
Smith, J. L., Hammondsport.
Smith, E., & Son, Geneva.
Studley, M., Fredonia.
Stone, T. L., Sonyea.
Schwerk, W. H., East Otto.
Sweet, W. J., Sheridan.
Tenney, Clyde, Hamlin.
Taber, W. F., Poughkeepsie.
Tinker, D. H., Fredonia.
Thies, J. C., Fredonia.
Tanner, Lester, Medina.
True, Mrs. C. H., Pittsford.
Tanner, S. W., Albion.
Temple, Mrs. Maurice, Lysander.
Taber, Charles D., Wilson.
Trumball, Thomas E., Stanley.
Tolles, E. B., Sheridan.
Tuttle, A. W., Fredonia.
Teats, J. H., Williamson.
Tripp, A. D., North Ridge.
Upham, Egbert, Ontario.
Urbana Wine Co., Keuka.
Van Wagenen, J., Jr., Lawyersville.
Van Alstyne, E., Kinderhook.
Van Buren, B. D., Stockport.
Van Gilder, Norton, Seneca Castle.
Van Epps, F. E., Stanley.
Van Buren, J. P., & Son, Stockport.
Van Epps, A. Y., Stanley.
Van Epps, F. E., Stanley.
Vail, F. W., Milton.
Vandervere, J. B., Oaks Corners.
Webb, Mrs. Walter, Scarborough.
Willard, S. D., Geneva.
Wilcox, I. A., Portland.
White & Rice, Yorktown.
Worden, Mont, Fayetteville.
Wilcox, B. F., Glenville.
Warner, C. H., Brocton.
Woodward & Jaques, Wrights Corners.
Warner, Henry, Orleans.
Wells, John, Shortsville.
Whiting, E., Seneca Castle.
Walker, Charles N., Hartland.
Wells, D. M., Phelps.
Wood, Albert, & Son, Carlton Station.
Wilson, R. D. Wrights Corners.
Willis, F. A., Pulaski.
Wetmore, W. E., East Wilson.
Wood, Denton, Stanley.
Watson, John, Fredonia.
Watson, Ira, Fredonia.
Wilcox, Clark, Fredonia.
Wilcox, E. P., Fredonia.
Wells, D. H., Fayetteville.
Worden, Palmer, Fayetteville.
Wells, S. J., & Son, Fayetteville.
White, Henry B., Laona.
Whittaker, E. S., Reeds Corners.
Woolford, E. M., Weedsport.
Watrous, C. S., Arkright.
Wiley, H. S., Cayuga.
Wilson, T. B., Halls Corners.
Weaver, H. F., Fredonia.
Wollert, C. F., Laona.
Wolber, H., Fredonia.
Will, Wm. F., Sheridan.
Young, L., Fredonia.

New York State Horticultural Awards at the Pan-American Exposition.

Awards of gold medals were made by the New York State Board of Managers as follows:

For general exhibit of pomaceous fruits, grown in 1901.

For collection of apples, 345 varieties, grown in 1900 and kept in cold storage. Exhibit continuous from May first to November second.

Display of pomaceous fruits grown in 1900.

Display of pears grown in 1901.

Exhibit of peaches.

Exhibit of plums.

Collection of grapes grown under glass.

Display of grapes grown in 1901.

Display of currants.

Collective exhibit of strawberries, June twenty-third to October thirty-first.

Collective exhibit of bush fruits.

Display of pomaceous fruits grown in 1900 and kept in cold storage.

Display of wine.

To exhibitors in New York State gold medals were awarded as follows:

Chautauqua Grape and Wine Association, collective exhibit of grapes grown in Chautauqua county.

Chautauqua Grape and Wine Association, collective exhibit of fruit grown in Chautauqua county.

Cornell University, Ithaca, general display of fruits.

Dotshome Farm, Fayetteville, display of fruits of superior merit.

D. M. Dunning, Auburn, largest cluster of grapes exhibited at the exposition.

D. M. Dunning, Auburn, display of grapes grown under glass.

C. H. Darrow & Co., Geneva, general display of fruits of superior excellence.

George A. Davis, Mexico, collection of strawberries of superior excellence.

Ellwanger & Barry, Rochester, collection of fruit.

Ellwanger & Barry, Rochester, collection of pears.

A. G. Eighme, Lockport, general exhibit of fruit of superior excellence.

John Hutt and S. C. Shaver, Cobleskill, display of Esopus Spitzenburg apples grown in Schoharie county.

Grant G. Hitchings, South Onondaga, collection of apples.

Charles W. Jennings, Belleville, collection of thirty-five varieties of apples of superior quality grown in Jefferson county.

George S. Josselyn, Fredonia, large and superior display of grapes.

New York State Fruit Growers' Association, L. T. Yeomans, president, large and highly creditable exhibit of New York State fruits.

New York Agricultural Experiment Station, Geneva, display of 128 varieties of gooseberries.

New York Agricultural Experiment Station, Geneva, a highly meritorious display, consisting of 70 varieties of apples, of the crop of 1900, and 161 varieties of the crop of 1901, making a continuous display during the entire season of the exposition.

New York Agricultural Experiment Station, Geneva, a highly meritorious display of plums, consisting of 113 varieties.

New York Agricultural Experiment Station, Geneva, a highly meritorious display of grapes, 122 varieties.

New York Agricultural Experiment Station, 56 varieties of currants.

New York Agricultural Experiment Station, an extensive, continuous and highly interesting exhibit of fruit.

William Palmer, Grooms, a highly meritorious exhibit of strawberries, consisting of 70 varieties.

W. H. Pillow, Canandaigua, a continuous and highly creditable exhibit of fruit.

S. D. Willard, Geneva, a meritorious exhibit of Wilder and White Imperial currants.

S. D. Willard, Geneva, a comprehensive exhibit of fruits of high, superior merit, continuing throughout the exposition.

S. D. Willard, Geneva, display of Kieffer pears.

I. A. Wilcox, Portland, a comprehensive and highly creditable display of fruits.

Woodward & Jacques, Lockport, a comprehensive and highly creditable display of fruits.

Van Buren & Son, Stockport, display of Lady apples.

G. E. Ryckman & Son, Brocton, display of New York State (Brocton) wines.

Germania Wine Cellars, Hammondsport, display of champagne.

Erie Preserving Co., Buffalo, display of canned fruits.

Boomer & Boschert Press Co., Syracuse, cider mills.

J. Hungerford Smith, Rochester, display of syrup mixing apparatus.

Spramotor Co., Buffalo, display of spraying machines.

Awards of silver medal were made to the New York State Board of Managers as follows:

Collection of nuts.

Collection of grapes grown in 1900, and kept in cold storage.

Collection of pears grown in 1900, and kept in cold storage.

To exhibitors in New York State silver medals were awarded as follows:

R. A. Babcock, Spencerport, collection of apples.

S. S. Crissey, Fredonia, collection of fruit.

S. S. Crissey, Fredonia, special display of assorted and fancy packed grapes.

George H. Cole, Penn Yan, collection of grapes.

Elmer N. Coye, Bristol Springs, display of grapes of superior merit.

Samuel Cooper, Delavan, continuous display of a new seedling strawberry named Pan-American, from July eighteen to November second.

Dutchess County Agricultural Society, Poughkeepsie, collection of apples.

Essex county, collection of apples.

W. L. Eastman, Ovid, collection of apples.

E. H. Fay & Son, Portland, general display of fruits of merit.

Hart & Scott, Penn Yan, collection of grapes of superior merit.

J. B. Hadden, Pultney, collection of grapes.

C. G. Hooker, Rochester, seedling currant, "Perfection."

T. S. Hubbard Co., Fredonia, display of 50 varieties of grapes.

King & Robinson, Trumansburg, display of fruits of superior merit.

Henry Lutts, Youngstown, general display of fruits.

John N. Lewis, Anandale, display of Newtown Pippin apples.

David Lidzy, Selkirk, a large and meritorious display of apples.

George S. Josselyn, Fredonia, display of Campbell's Early grapes.

S. W. McCollum, Lockport, display of fruits of merit.

Jonas Martin, Brocton, display of grapes and plums.

Jacob Moore, Vine Valley, an interesting and valuable display of hybridized seedling fruits.

Onondaga county, collection of apples, collected by C. M. Peck, Fayetteville.

New York Agricultural Experiment Station, Geneva, new seedling grape.

Ontario County Fruit Growers' Association, extensive display of apples and pears.

James G. Patterson, Sheridan, meritorious display of nuts.

William Palmer, Grooms, a comprehensive and creditable display of fruits.

G. E. Ryckman, Brocton, display of Ryckman's strawberries.

C. H. Fay, Portland, display of Chautauqua Climbing currants.

E. Smith & Son, Geneva, display of pears.

J. S. Smith, Hammondsport, display of Catawba grapes.

F. W. Vail, Milton, display of peaches.

White & Rice, Yorktown, a comprehensive and meritorious display of fruits.

Palmer Worden, Fayetteville, collection of grapes.

Samuel J. Wells & Son, Fayetteville, display of grapes.

H. S. Wiley, Cayuga, valuable display of fruits.

D. H. Wells, Fayetteville, collection of grapes.

Odd Fellows' Home, Lockport, display of fruits.

T. B. Wilson, Halls Corners, display of Hubbardston Nonesuch apples.

J. E. Lown, Penn Yan, display of Ben Davis apples.

G. F. Morse, Schuyler Falls, collection of apples.

A. G. Meicklejohn, Putnam Station, collection of apples.

E. L. Smith, Willsboro, collection of apples.

W. D. Barnes, Middlehope, display of Elberta peaches.

Mrs. J. T. McCready, Buffalo, display of canned fruits.

J. H. Smith Co., Rochester, display of fruit syrups.

To exhibitors in New York State bronze medals were awarded as follows:

Allnatt & Bliss, Fredonia, display of strawberries.

Allnatt & Bliss, Fredonia, display of plums.

William Aiken, Geneseo, display of raspberries.

L. G. Arnold, Benton Centre, display of pears.

L. B. Babcock, Fulton, display of apples.

Charles N. Baker, Selkirk, display of apples.

W. A. Bassett, Farmer, collection of apples.

Herbert Beattie, Halls Corners, collection of apples.

W. H. Becker, Portland, collection of grapes.

S. P. Belden, East Williamson, display of blackberries.

W. F. Benjamin, Fredonia, collection of fruit.

James F. Bennett, Eagle Harbor, display of Baldwin apples.

Birdseye & Son, Stanley, display of fruit.

Fay Bloomingdale, Alabama, collection of apples.

G. H. Bradley & Son, Lake Road, display of Duchess of Oldenburg apples.

L. G. Brainard, Ellington, display of fruit.

H. L. Brown, Carlton, display of Orange quinces.

J. G. O. Brown, Wilson, collection of apples.

John Carlton, Rochester, display of new seedling grape (Charlton).

P. G. Cato, Fredonia, display of fruits.

W. A. Clark, Eden Centre, display of new seedling grape.

Chautauqua Fruit and Grape Juice Co., Westfield, unfermented grape juice.

F. B. Clothier, Silver Creek, general display of fruits.

E. J. Cole, Sheridan, display of grapes and plums.

J. B. Collamer & Son, Hilton, Twenty Ounce apples.

E. L. Colvin, Fredonia, display of fruits.

L. E. Cowden, Fredonia, display of fruits.

Fred Crosby, Crosby, display of grapes and plums.

I. N. Crosby, Pekin, display of Niagara grapes.

John W. Crosier, Halls Corners, display of fruits.

T. N. Cross, Poughkeepsie, collection of apples.

F. E. Dawley, Fayetteville, display of Orange quinces.

Duffy, Montfort & Green, Newark, apple cider.

G. D. Ells, Schuyler Falls, collection of apples.

Fairview Fruit Farm, Lockport, collection of pears.

L. J. Farmer, Pulaski, collection of strawberries.

O. N. Fay, Portland, display of Campbell's Early grapes.

Ferguson Bros., Voorheesville, display of apples.

H. C. Foster, Canandaigua, collection of grapes.

W. L. Foster, Canandaigua, display of Bosc pears.

George W. Fuller, Portland, display of fruits.

Frank Giles, Sheridan, collection of grapes.

Gleason Fruit Juice Co., Ripley, unfermented grape juice.

C. A. Green, Rochester, display of Red Cross currants and Corsican strawberries.

A. W. Griffin, Hartland, display of fruits.

P. V. Hixon, Appleton, collection of apples.

F. W. Hill, Adams Basin, collection of apples.

N. W. Harder, Kinderhook, collection of apples.

J. W. Harkness, Harkness, collection of apples.

F. W. Hill, Adams Basin, collection of apples, crop of 1900.

James A. Hulbert, South Onondaga, collection of apples.

John W. Hand, East Hampton, display of apples and peaches.

Ira S. Jarvis, Hartwick Seminary, collection of apples.

A. Kusniski, Fredonia, display of grapes.

J. O. Lockwood, Olcott, meritorious display of peaches.

David Macfarlane, Scarborough, display of gooseberries.

Hugh M. Magee, Groveland, display of hickory nuts.

George Miller, Bristol Springs, wines.

H. M. Miller, Barry Centre, collection of apples.

Mrs. M. E. Marsh, Fredonia, collection of grapes.

W. T. Mann, Barkers, meritorious display of apples.

W. L. McKay, Geneva, meritorious display of fruits.

George Marks, Canandaigua, collection of fruits.

New York State Board of Managers, collection of quinces grown in 1900.

F. Norton, Jeddo, collection of apples.

George R. Nellis, Clarkson, display of peaches.

M. F. Pierson, Stanley, extensive display of fruit.

O. C. Palmer, Union Hill, collection of apples.

H. J. Porter, Fredonia, display of fruits.

George Pettit, Portland, display of fruits.

George T. Powell, Ghent, display of fruits.

Norman Pomeroy, Lockport, continuous display of English walnuts.

Putnam & Worden, Fayetteville, collection of grapes.

R. J. Presler, Stanley, display of apples.

C. G. Presler, Ferguson's Corners, display of apples.

John T. Roberts, Syracuse, collection of apples.

A. Reisinger, Naples, display of grapes.

Dr. C. A. Ring, Appleton, display of fruits.

Louis Roesch, Fredonia, display of fruits.

G. E. Ryckman, Brocton, display of fruits of merit.

G. E. Ryckman & Son, Brocton, display of grapes.

Lawrence Ryckman, Brocton, display of Niagara grapes.

F. N. Randall, Ripley, unfermented grape juice.

Duncan Rhind, Canandaigua, collection of grapes grown under glass.

G. E. Ryckman & Son, Brocton, unfermented grape juice.

G. E. Ryckman, Brocton, brandy.

M. Studley, Fredonia, display of strawberries.

F. H. Snyder, Ghent, collection of apples.

C. L. Stearns, North Syracuse, display of new seedling apple of merit.

C. L. Stearns, North Syracuse, collection of apples.

F. H. Snyder, Ghent, display of Ben Davis apples.

Truman L. Stone, steward of Craig Colony, Sonyea, collection of strawberries.

I. N. Stebbins, Albion, display of fruit.

H. M. Stone, Rock Station, display of fruit.

W. L. Smith, Portland, collection of grapes.

J. H. Teats & Son, Williamson, display of peaches.

A. W. Tuttle, Fredonia, display of Early Crawford peaches.

Mrs. Nelson Tenney, Hamlin, display of gooseberries.

Urbana Wine Co., Urbana, collection of grapes.

F. E. Van Epps, Stanley, display of fruit.

A. Y. Van Epps, Geneva, display of plums.

Edward Van Alstyne, Kinderhook, collection of apples.

H. S. Wiley, Cayuga, collection of apples.

H. S. Wiley, Cayuga, display of Mercereau blackberries.

Denton Wood, Stanley, display of apples and quinces.

Mont Worden, Fayetteville, display of fruits.

Albert Wood & Son, Carlton Station, creditable display of fruit.

F. A. Willis, Pulaski, creditable display of apples.

The Welch Grape Juice Co., Westfield, Welch's grape juice.

W. F. Will, Sheridan, display of Rathbone blackberries.

L. Young, Fredonia, display of grapes and berries.

To exhibitors in New York State honorable mention was awarded as follows:

James Allen, Middleport, display of Baldwin apples.

Mrs. G. H. Arnold, Bently, display of apples.

S. M. Avery, Fredonia, display of pears and currants.

George Aldrich, Silver Creek, display of grapes.

E. F. Beach, Silver Creek, display of grapes.

E. Button, Lockport, display of strawberries.

S. E. Burdough, Lyons, display of apples.

A. Bowman, Hartland, display of apples.

Herbert Breathe, Stanley, collection of apples.

Levi Bell, Sparkill, display of plums.

William H. Barden, Halls Corners, display of apples.

Beal & Son, Victor, display of Baldwin apples.

W. T. Hart, Poughkeepsie, collection of apples.

E. A. Barnes, Lockport, display of plums.

D. G. Bliss, Fredonia, display of fruit.

W. A. Bassett, Farmer, display of pears.

J. D. Burdick, Fredonia, display of Lucretia dewberries.

W. S. Cockburn, Silver Creek, display of Worden grapes.

Fred W. Clark, La Grange, collection of apples.

J. F. Converse & Co., Woodville, collection of apples.

T. Costello, Benton Centre, collection of pears.

Thomas Cant, Clarksville, collection of apples.

A. U. Cockran, Westfield, display of Niagara grapes.

A. C. Condit, Geneva, display of apples and pears.

J. W. Coughtry, New Scotland, display of cherries and pears.

M. S. Curtis, Fredonia, display of fruits.

A. B. Cranston, Sheridan, display of fruits.

U. E. Dodge, Fredonia, display of Delaware grapes.

George B. Douglas, Dunkirk, display of Niagara grapes.

C. M. Day, Geneva, display of pears and quinces.

William Dufloo, Sodus, display of fruits.

Charles Duncan, Appleton, display of apples and plums.

A. H. Dutton, Youngstown, display of apples.

H. D. Dunkley, Fredonia, display of Fay currants.

Day & Hall, Fredonia, display of strawberries.

George W. Dunn, Webster, display of apples.

S. DeLos Davis, Barker, display of Bosc pears.

C. Edwards, Dunkirk, display of strawberries.

S. Edick, Olcott, display of peaches and pears.

W. L. Foster, Canandaigua, display of grapes.

J. B. Fuller, Holley, display of King apples.

P. T. Gibbons, Sheridan, display of Concord grapes.

C. Green, Fredonia, display of strawberries.

H. J. Grouinhauck, Fredonia, display of Jessie strawberries.

Elias Gates, Coxsackie, collection of apples.

William D. Genus, Leona, display of Brandywine strawberries.

M. N. Hubbard, Fredonia, display of Jessie strawberries.

E. E. Hamlet, Sheridan, collection of grapes.

Ashley B. Howes, Canaan, collection of apples.

J. Hardenburg, Fredonia, display of cherries.

J. A. Hepworth, Marlboro, display of currants.

G. A. Houseman, Carlyon, display of fruits.

E. T. Hart, Fredonia, display of fruits.

Mrs. A. H. Johnson, Fredonia, display of Fay currants.

J. P. Inslie, Clifton Springs, display of apples.

G. Jaarda, Fredonia, collection of grapes.

Mrs. S. U. Johnson, Canandaigua, display of Orange quinces.

E. Knapp, Seneca Castle, collection of apples.

F. E. Knight, Portland, display of grapes.

C. Keen, Syracuse, collection of apples.

H. U. King, Clifton Springs, collection of apples.

W. I. Ketchem, Wright's Corners, display of fruit.

H. B. Lewis, Fredonia, display of strawberries.

Mrs. Charles Lewis, Flint, display of Hislop crab apples.

G. Loucks, Scriba, display of Rhode Island Greening apples.

J. M. Lown, Gage, collection of apples and pears.

Mrs. A. Losee, Fredonia, collection of apples.

Mrs. H. L. Losee, Fredonia, display of apples.

H. F. Morgan, Fredonia, collection of grapes.

Maxwell Bros., Geneva, display of pears.

F. L. Mixer, Fair Haven, display of apples.

G. F. Morse, Schuyler Falls, collection of apples.

Charles Mann, Breakabeen, collection of apples.

T. C. Maxwell, Geneva, display of apples.

H. G. Miner, Sheridan, collection of apples.

E. S. Miller, Germantown, display of apples.

A. G. Meicklejohn, Putnam Station, collection of apples, crop of 1900.

George W. Marsh, Portland, display of fruits.

H. R. McNair, Dansville, display of apples.

George Miller, Bristol Springs, collection of grapes.

H. J. Nellis, Stanley, collection of apples.

D. A. A. Nichols, Westfield, display of pears.

J. K. Nickleson, Oaks Corners, collection of peaches and plums.

Mrs. G. H. Perkins, 221 East avenue, Rochester, display of Bismarck apples.

L. T. Parker, Leona, display of Fay currants.

W. H. Purdy, South Livonia, display of Doyne de ete pears.

J. A. Putnam, Fredonia, display Clapp's Favorite pears.

J. A. Powers, Portland, display of Fay currants.

D. L. Prisch, Middleport, display of apples.

George W. Potter, Somerset, display of Keifer pears.

H. J. Putnam & Son, Fredonia, collection of grapes.

L. C. Patterson, Sheridan, collection of grapes.

Henry Pettit, Portland, collection of grapes.

E. A. Rowley, Albion, display of Roxbury Russet apples.

Chris Raming, McNeils Corners, collection of apples.

F. L. Reeves, Palmyra, collection of apples.

J. A. Reynolds, Ontario, collection of grapes.

Duncan Rhind, Canandaigua, display of pears.

W. H. Robertson, Stanley, display of apples.

E. L. Smith, Willsboro, display of apples, crop of 1900.

W. A. Scott, Sheridan, display of grapes.

John W. Spencer, Westfield, display of fruits.

W. K. Stebbins, Sheridan, collection of grapes.

W. H. Schwerk, East Otto, collection of grapes.

W. I. Smith, Hilton, collection of apples, crop of 1900.

George W. Snyder, Scriba, collection of apples, crop of 1900.

S. Stace, Charlotte, collection of apples.

John Swan, Vine Valley, collection of grapes.

Edward C. Smith, Gasport, display of Baldwin apples.

G. H. Stacey, Syracuse, collection of apples, crop of 1900.

George S. Semon, Spencerport, display of Orange quinces.

George N. Skinner, Fredonia, collection of grapes.

E. B. Tolles, Sheridan, display of fruit.

D. A. Tripp, North Ridgeway, display of peaches.

W. F. Taber, Poughkeepsie, display of Brandywine strawberries

Clyde W. Tenney, Hamlin, display of Baldwin apples.

Thomas E. Trumball, Stanley, collection of apples.

Charles D. Taber, Wilson, collection of apples.

Lester Tanner, Medina, display of strawberries and apples.

Mrs. C. H. True, Pittsford, display of berries and nuts.

Jared Van Wagenen, Jr., Lawyersville, collection of apples, crop of 1900.

Henry Warner, Orleans, display of apples.

H. F. Weaver, Fredonia, collection of strawberries.

B. F. Wilcox, Glenville, display of fruit.

E. S. Whittaker, Reeds Corners, display of Orange quinces.

E. W. Woolford, Weedsport, collection of apples.

Samuel J. Wells, Fayetteville, collection of apples, crop of 1900.

E. C. Warner, Cobleskill, display of strawberries.

Alex. Coon, Medina, collection of plums.

Clark H. Cramer, Hartland, display of Maiden Blush apples.

Irving W. Crandall, Albion, display of Baldwin apples, grown in 1900.

G. Couchman, Fredonia, display of Champion grapes.

S. C. Dailey, Lockport, display of fruit.

J. H. DeWitt, Fredonia, display of raspberries.

U. E. Dodge, Fredonia, display of seedling peaches.

Mrs. George W. Davis, Lancaster, display of Barlett pears.

Lewis C. Fairchild, Bath, display of Fallawater apples.

A. W. Foote, West Somerset, display of apples.

J. B. Garbutt, Barker, display of apples.

C. W. Lowns, Penn Yan, display of apples.

E. C. Merrill, Geneva, display of apples.

W. B. Mead, Portland, display of Burbank plums.

Mrs. Charles Miller, Geneva, display of pears.

S. S. McNamara, Graham, display of plums.

E. J. McClew, Newfane, display of Twenty Ounce apples.

William H. Outwater, Olcott, display of plums.

George B. Nellis, Clarkson, display of Smock peaches.

Calvin Nichols, Willink, display of plums.

A. M. Phelps, Stanley, display of apples.

R. J. Paschke, Fredonia, display of Bell pears.

Leonard Rea, Coxsackie, collection of apples.

W. Henry Roberts, Syracuse, display of Yellow Transparent apples.

C. C. Robertson, Ransomville, display of Bartlett pears.

Wheeler Rose, Syracuse, display of Fallawater apples.

George Simmons, Geneva, display of Wealthy apples.

E. O. Smith, Somerset, collection of apples.

Sheldon Butler, Sheridan, collection of grapes.

Stone Bros., Scriba, display of Bartlett pears.

G. H. Simmons, Geneva, display of Anjou pears.

E. W. Skinner, Portland, display of Niagara grapes.

S. A. Smith, Stanley, collection of peaches.

New York State Board of Managers, display of tropical fruits and apples grown under glass.

E. L. Smith, Mexico, display of Hislop crab apples.

Charles E. Walker, Hartland, display of Greening apples.

R. D. Wilson, Wrights Corners, collection of apples.

John Wells, Shortsville, display of peaches.

C. W. Steadman, Warrens Corners, display of Fall Pippin apples.

T. C. Thier, Fredonia, display of strawberries.

A. W. Tuttle, Fredonia, collection of peaches.

D. W. Tucker, Fredonia, collection of strawberries.

J. B. Vanderveer, Oaks Corners, display of peaches.

Norton Van Gilder, Seneca Castle, display of apples.

C. L. Watrous, Arkright, display of apples, crop of 1900.

H. E. Wyckoff, Sheridan, display of Bartlett pears.

Henry B. White, Leona, display of Orange quinces.

Edward Whiting, Seneca Castle, display of Twenty Ounce apples.

John Watson, Fredonia, display of Clapp pears.

C. F. Lewis & Co., Brocton, unfermented grape juice.

J. D. Davis, Westfield, brandy.

J. D. Davis, Westfield, wines.

A FEW OF THE
INSTITUTE QUESTIONS
AND ANSWERS.

Question Box.

FEEDING ANIMALS.

Question.— What proportion of the grains make a balanced ration for fresh cows fed with cornstalks?

Dr. Smead.— In the fifteen pounds of food that the cow needs daily there should be one pound of the protein to five and a half of the carbohydrates. Clover hay is nearly a balanced ration of itself, but it is so bulky that the animal cannot eat enough to get the required amount of protein; oats also are nearly balanced. To balance your ration of cornstalks you should feed something rich in protein, as the stalks are of a directly opposite character; while cottonseed meal is of this nature, I would not advocate feeding it with the cornstalks, except in small amounts; use linseed meal in preference; buckwheat middlings are one of the best foods of this character.

Question.— What is protein and of what special use is it to the animal?

Prof. Harding.— It is the name applied to those parts of the food that contain nitrogen. This element is used to build up the muscular and nervous system and to make blood. The carbohydrates, on the other hand, supply heat and energy to the body; this element is more common in the foods raised on the farm than the former. A balanced ration means that the animal has as much of these separate elements as needed. A rigid ratio can hardly be adopted; much depends upon the individuality of the animal. Ordinarily one part of the protein to about five and one-half of the carbohydrates is a fair ration. All who are interested, as all farmers should be, should send to the Cornell University Experiment Station at Ithaca for Bulletin No. 154, and to the New York Experiment Station at Geneva for Bulletin No. 217, as these give a great deal of valuable information on compounding rations.

Question.— Please explain the difference in the effect of the protein found in the gluten foods and that found in the oil meals.

Prof. Cavanaugh.— I do not think that the difference is to be attributed so much to the protein of these foods as to the oil and fat which they contain. The two elements are so intermingled that it is difficult to ascertain.

Question.— What is the effect of feeding a ration that is too rich in protein?

Mr. Witter.— It tends to produce an excess of blood.

Question.— If clover is rich in protein and in carbohydrates, why not feed it exclusively for milk?

Mr. Cook.— Because it is so bulky that an animal must eat an enormous amount to secure the necessary amount of protein.

Question.— What is gluten meal?

Mr. Van Dreser.— It is the by-product of corn; starch manufacture. The starch has been removed and it leaves a food that is rich in the protein element.

Question.— Why is grain after the sugar and starch have been taken out better for feeding than the whole grain?

Prof. Harding.— Because the more valuable feeding element, protein, is left and we get a greater amount from the same bulk than in the whole grain.

Question.— How does bran compare with ground oats for feeding dairy cows?

Mr. Witter.— Both are valuable, but somewhat different. Oats have a peculiar property that no other food has; they act as a nerve stimulant; nothing has been found that will take their place in this respect. The ordinary cow will take them whole with better results. I believe as far as possible in growing upon the farm the grains we feed. In this way we may be sure that they are not adulterated.

Question.— Which is the best for milk, wheat middlings or bran?

Mr. Witter.— Middlings contain a little more digestible matter than bran, but it cannot be fed alone to any great extent; for the best results the food must be made palatable.

Question.— What is the feeding value of wheat bran at eighteen dollars per ton, as compared with oats at thirty-two cents a bushel?

Mr. Witter.—At these figures the bran would be a little cheaper when the amount of digestible nutrients is considered; but bran is so often adulterated that I would give the home grown oats the preference.

Question.— Is there any nourishment in the fibre of foods?

Prof. Cavanaugh.— None, or very little; yet it has a value in aiding in the digestion of other foods.

Question.— Wherein is the danger from feeding cotton seed meal?

Mr. Witter.— It is very rich and constipating; it is almost an ideal food when the cows are first put on spring pasture; it should only be fed in moderation, and never to young stock.

Question.— How are brewers' grains for milk production?

Mr. Cook.— I do not think they are quite as digestible as some other foods.

Question.— Is bran a better ration for milk production than middlings?

Mr. Cook.— I prefer the middlings, although bran is excellent in its place; it is good to mix with the more concentrated foods.

Question.— How does speltz compare with oats for feeding stock?

Dr. Smead.— This crop is grown to some extent in Minnesota, where I have had an opportunity of observing it; its feeding value is not quite equal to that of oats, and it should never be fed unground; it will grow on poorer soil than oats or other grain. The straw of speltz has about the same value as oat straw.

Question.— Will it pay to feed the cows grain in the summer?

Mr. Witter.— Some experiments at Cornell University Experiment Station showed that only when the cow had an abundance of pasture grasses did the feeding of grain fail to increase the milk flow.

Question.— What feeds at present prices are the most profitable to buy for milk?

Mr. Van Wagenen.— We should buy that class that is rich in protein; do not buy the starchy foods, as we can readily raise all we require; buy linseed meal, gluten or cotton-seed meal; the latter should be fed sparingly. In brewers' grains the starch has been removed in the process of malting and the residue is rich in protein.

Question.— What should be added to clover hay and corn stover to make a balanced ration?

Mr. Witter.— You can feed with profit from ten to twelve pounds of grain a day. I would advise a mixture of one-third each of bran, middlings and gluten meal. If you have corn silage in place of the corn stover feed six or seven pounds a day.

Question.— Which is better this year to feed horses, hay or straw?

Mr. Spencer.— I believe that straw can be fed to advantage when the horses are not working, if we increase the grain ration; we feed about eight quarts a day of a mixture of bran and meal; we also feed a few carrots, which have a value from their succulence.

Question.— Which is the best for milk, sugar beets or silage?

Mr. Cook.— It is a question if you can afford to raise beets; I certainly would not grow the sugar beet; the mangel is preferable. If you have no silo it might be well to raise them for their succulence.

Question.— What is the feeding value of sugar beet pulp?

Mr. Cook.— Some careful experiments along this line have been made at Cornell University Experiment Station. The results would show that it is about one-half that of good silage; it has, like silage, an additional value from its succulence, particularly if the animal is being fed largely upon dry food. It could be had this winter for about $1.50 a ton.

Question.— Is there any profit in selling oats at thirty-five cents a bushel and buying bran at $22 a ton?

Mr. Cook.— I should say not. What is your opinion, my hearers?

A vote of the audience showed that they agreed in this.

Question.— What is the value of pea vines?

Mr. Witter.— It is difficult to say; it depends on the condition of the vines; if properly cured they are nearly as valuable as clover hay; I have also seen good silage made from them; they have also considerable manurial value.

Question.— What is the best to sow for the quickest returns for fodder?

Mr. Van Alstyne.— Rye can be cut the earliest, but it is necessary to sow it the previous fall; it should be cut, for the greatest feeding value, before the seed forms. For the spring sowing oats and peas will give the quickest returns; they should be sowed early in April, using two bushels of Canada peas to one and one-half of oats; this will begin to furnish feed the last of June, when the pastures are getting short; we usually make two sowings about ten days apart.

Question.— What is the feeding value of cabbage as compared with corn silage?

Mr. Witter.— It is practically a balanced food in itself, but like all foods that are rich in protein it must be fed with caution; if fed in connection with other foods it will be worth much more than silage; it is also valuable from its succulence, especially if we are feeding all dry food. With hay of such an unusually poor quality as it is this year I should consider cabbage worth fully five dollars a ton.

Question.— How many times a day would you feed cattle?

A vote of the audience showed that the best way is to feed three times a day.

Mr. Cook.— I prefer feeding silage night and morning, and the dry food at noon; I do not think the cow will do as well if she has her entire silage ration for the day at one feeding; regularity in feeding is very important.

Question.— What about these condimental stock foods? Are they good for stock, and of what are they composed?

Mr. Cook.— Foods of this nature might be classed with condition powders, as there is no doubt of their being beneficial when the animal needs a little toning up; the objection to them is that they cost several times as much as the farmer can buy the same ingredients for elsewhere. Here is a recipe for a good condition powder, which we keep constantly on hand: 100 pounds of oil meal, 5 pounds of powdered charcoal, 5 pounds of common salt, 5 pounds of epsom salts, 4 pounds of gentian, 4 pounds saltpeter and 3 pounds fenugreek. This mixture of 126 pounds may be purchased for five dollars. It should never be given to an animal that is in good condition. The dose should never be to exceed a half pound.

Question.— Are bean pods worth anything as feed?

Mr. Van Alstyne.— Yes; they have a good feeding value, although I have not the analysis with me; they are particularly good for sheep; they should be fed with caution, however, as they are liable to affect the kidneys.

Question.— Where can I obtain full information as to the feeding and fertilizing values of farm products and the purchased cattle foods?

Mr. Van Alstyne.— Get the bulletin from the New York Experiment Station at Geneva; also invest two dollars in Professor Roberts' book on "The Soil," and Wool & Farrington's book upon "Milk and Its Products;" these can be had for a dollar each, and I know of none that contain as much valuable information.

Question.— I have been feeding my horse ground wheat and oats, equal parts by weight, and timothy hay. Would oil meal help the ration, and how much should be fed?

Answer.— This is a very good ration, but I should add about a handful of the oil meal three times a day; this will supply quite a little additional protein; I should prefer the grain ration to be two-thirds oats and one-third wheat.

Question.— What is the difference in the values of the bran or the middlings of spring and winter wheat?

Mr. Van Alstyne.— There is more difference in the grade of the wheat or in the milling than in the kind of wheat. Pay little attention to the kind of wheat, but be very particular as to the quality of the product as adulterations are so frequently practiced.

Question.— Of what value are malt sprouts as a food for milch cows?

Mr. Smith.— If you can buy them at ten dollars per ton it is the cheapest form in which we can buy protein; they contain about twenty-five per cent. of this element.

Question.— If a cow is fed on silage and meal in the morning, and hay at night, would she not do as well as if fed oftener?

Mr. Smith.— Some of the best milk producers in this State feed their cows but twice a day, night and morning.

Question.— How much more is gluten meal worth than corn meal to feed a milch cow?

Mr. Gould.— The two foods are wholly unlike, and are not comparable at all. If I should feed a cow ten pounds of corn meal it might not injure her, but if I should feed her ten pounds of gluten I would probably kill her. Gluten is a heavy protein food, while corn is a starch food.

Question.— How much gluten meal should a cow get in a day?

Mr. Smith.— That would depend on the individuality of the cow; one would stand more, another less. We do not feed to exceed two pounds of gluten mixed with three pounds of bran; sometimes we add a pound of cottonseed meal; we also add one pound of oil meal.

Question.— Shall we feed a narrow or wide ration at the present prices of feed?

Mr. Gould.— Feed as narrow as you can or as high as one to seven, but I doubt if any farmer can afford to feed a wider one, provided his cows are dairy cows.

Mr. Smith.— When a cow makes thirty pounds of milk a day, unless she has sufficient protein in her ration, she will take it from the lean meat on her body or else shrink her milk flow. Any system of feeding other than balancing the ration will soon dry up the milk flow of any cow.

Question.— What is the feeding value of ground corn cobs?

Mr. Van Alstyne.— About the same as that of straw.

Question.— Do you advise the use of dried distillers' grains?

Mr. Dawley.— I do; I consider them one of the best of cattle foods; they are rich in protein, and though probably not quite so digestible as the gluten feeds I consider them safer.

Question.— What is the value of skim milk for feeding?

Mr. Cook.— About twenty cents per hundred. It has also a manurial value of ten cents per hundred, if properly saved and applied.

Question.— What is the relative feeding value of sweet and sour skim milk?

Mr. Cook.— I do not know that the first stages of fermentation in the milk injures its feeding value, but the trouble is to have it in the same condition each time; where it is fed sweet at one time and moderately sour at another the animals' digestion will be affected, for that reason I prefer feeding it sweet. I believe that in time all skim milk will be pasteurized at the factory, thus keeping it sweet indefinitely.

Question.— Which is the better feeding, common clover or alfalfa, no other food considered?

Mr. Cook.— Alfalfa is unquestionably best, the cows like it, and it is a splendid milk producer. The difficulty seems to be in this Northern climate (St. Lawrence county) to keep it through the winters; but it is so valuable that we should keep on trying, and I believe that we will eventually be successful. The feeding value of good well-cured alfalfa hay as compared with bran is eleven to eight; that is eleven pounds of the alfalfa is equal to eight pounds of wheat bran.

Question.— Can a farmer afford to sell corn and buy gluten?

Mr. Van Alstyne.—At present prices there is little difference in the cost, while a ton of straight gluten equals in its protein contents two tons of corn. So if we have corn silage to feed we can afford to sell corn and buy the gluten which contains the protein needed.

Question.— Will it pay to feed Buffalo gluten feed at present prices?

Mr. Van Alstyne.— Different brands vary so greatly that they should be bought only on the guaranteed analysis, which every dealer is obliged to give when requested. The different brands vary from twelve per cent. to thirty-five per cent. of protein. I am not in favor of an excessive grain ration.

Question.— Does feeding frozen silage tend to decrease the flow of milk?

Mr. Van Alstyne.— It will if it is fed while frozen, but if it is fed immediately after it is thawed it is not injured in the least.

Question.— How can we make a complete ration for the cow from wheat, corn, oats and barley?

Mr. Van Alstyne.— Wheat, corn and barley are all excessively starchy. A complete ration with these foods will be very expensive, unless our coarse food is largely clover, alfalfa or oats and peas. While the standard ratio is one to five and a half it is not necessary to hold to it strictly. Different cows require different rations, as was conclusively proved by our tests at the Pan-American Exposition last summer. It has been shown that where silage is fed the ration may be as wide as one to seven, with good result; again, it may be a question of cost; this year the protein foods are exceptionally high; it is not so much a question of the greatest amount to be produced as a question of the greatest net profit, always remembering that the cow must be kept in good condition.

Question.— What are the value of beets for feeding cattle and sheep?

Mr. Cook.— It is difficult to say; where silage is not fed they have an additional value from their succulence, and I believe that with silage a few may profitably be fed. Turnips are preferable for sheep.

Question.— How many kinds of grains were fed at the Pan-American Exposition test, and how much of each kind?

Mr. Ennis.— I don't know, but I can tell you what varieties were fed — wheat bran, gluten, cotton seed, corn meal and some others; but the main foods were wheat bran and gluten; both dry and green clover, and silage were fed. As high as twelve pounds of grain were fed to some cows, but I do not believe the average was above ten pounds per day.

Question.— At the usual price of feed and cheese, does it pay to buy mill feed to feed with good silage?

Mr. Smith.— As a rule I do not believe that the man having ordinary good cows can afford to attempt the making of milk out of nothing. Milk contains certain elements. The elements which make lean meat, that which we call muscle and blood, also make milk. If the cow is required to make milk and keep up her physical condition she must have foods that contain these elements; they are not found in silage or corn meal, as they only produce fat and heat; there must be some protein foods fed in connection with the silage.

Question.— How much cottonseed meal may safely be fed to a cow giving milk?

Mr. Witter.— As a rule not more than two or three pounds per day.

Question.— Which is worth the most to feed for milk production, ground oats or wheat bran, and how much more?

Mr. Smith.— Wheat bran at the present prices of cattle foods is the most profitable. Oats at fifty-two cents a bushel will buy enough more bran so that you cannot afford to feed them.

Question.— What is the value of pumpkins for feeding cows?

Mr. Gould.— They have just about the same natural value as have mangels, but are not as good as are carrots.

Question.— How high ought the ceiling of a cow stable to be?

Mr. Wing.— I think a height of nine to ten feet is about right.

Question.— What is the best quality of bran?

Mr. Gould.— That part that is nearest the outside of the kernel. It should be fine, flaky and free from canaille, middlings or flour to be the best quality.

Question.— What is the difference in feeding value between spring and winter wheat bran?

Mr. Smith.— Hardly any; not more than half a dollar, which is in favor of the spring wheat bran.

Question.— What is the value of corn bran as a cattle food?

Mr. Smith.— When they make glucose the corn is washed and ground, and the sugar taken out of it; the skin or hull is then dried and ground, and run through a series of sieves; the finer portion is known as "gluten meal," and there is from thirty to thirty-five per cent. of protein in it; the next grade is known as "gluten feed," and contains from twenty-five to twenty-seven per cent. of protein; the remainder is known as "corn bran," which contains from ten to twelve per cent. of protein. Hominy feed contains about eleven per cent. of protein, while corn meal has about nine. The greatest value of corn is in its starch, the fat and heat forming element.

Question.— I am feeding twenty pounds of hay, fifteen of beets and four of ground oats. What shall I add to make a balanced ration?

Mr. Smith.— Sell the oats and buy bran and gluten, because you can get more feeding value from such foods, at their present prices, than from oats. A good ration in connection with silage and clover hay is one made up of four pounds of bran, two of gluten and one of linseed meal; perhaps a pound of cottonseed meal would be better than the linseed under some circumstances; it would depend somewhat on the time the cows were in lactation and the quality of the roughage they were fed.

Question.— What do you think about growing beets for producing milk?

Mr. Gould.— If you do not have silage, grow beets for a succulent food; but my experience has been that 100 pounds of good silage is fully equal to 300 pounds of beets.

Question.— Does the feeding of smutty corn to cattle affect their health or milk value?

Mr. Gould.— So far, where carefully conducted experiments have been made, no injury has been found to have come from feeding smutty corn; but I would not feed it; it were better to gather such smutty corn and burn it, for the reason that if left on the ground the fungus might be conveyed to another crop the next year.

Question.— What is meant by the term "a balanced ration," or rather, the "nutritive ratio" of a food?

Mr. Gould.— The average is about two pounds or two and a half pounds of protein to fifteen or sixteen of carbohydrates. The ratio should be one to five and a half, or thereabouts, but there are some cows which will need a narrower one, while others will do equally well on a wider one; all will depend on the individuality of the cow.

Mr. Smith.— The cow must have carbohydrates enough to "make steam;" that is, heat enough to supply her animal needs; then give her a proper amount of the protein foods to supply the required per cent. of casein in her milk. One cow, as Mr. Gould says, will need more, another less of both elements.

Question.— Why does a cow pick up and eat corn cobs?

Mr. Gould.— The reason why the cow eats the cob is that she is after mineral matter; potash; if it were supplied in her foods in some form she would not eat cobs.

Question.— How many times a day should a cow be fed?

Several voices.— Three times a day, some saying four.

Mr. Gould.— Where is the man who says five times; I want to get at the bottom of this, because my grandfather fed his cows six times a day, and they were everlastingly poor. After twenty years experimental work I am fully of the opinion that a cow fed all she will eat up cleanly twice a day will give more milk and continue in better condition than when she is fed oftener.

Question.— How can we best grow our protein food?

Dr. Jordan.— At the Geneva Station we grow it in alfalfa; no form is better; where alfalfa cannot be grown the common clover is good. We have also grown the cow peas to some extent.

Question.— What is the best root crop for the dairy cow?

Answer.— Mangels are good, but carrots are preferable; if any amount of stock is kept silage is better than either.

Question.— Should a milk cow be grained before or after watering to get best results?

Mr. Smith.— What is your opinion, farmers?

Several voices.—After feeding her.

Mr. Smith.— Why?

Answer.— Because the foods will stay longer in her stomach.

Mr. Smith said it was a mistake, and told how the cows were fed and watered at the Geneva Experiment Station. He also said that those cows which have good water constantly before them when in the stable always give the most milk. They eat a few mouthfuls of hay and then drink a little. It is claimed that if the cows are kept as quietly as possible such treatment will produce the most milk at any time.

THE DAIRY.

Question.— Do you believe in cross breeding, and what is the best breed to cross Holsteins and Ayrshires with for milk production?

Mr. Van Wagenen.— It is generally admitted that more satisfactory results will be had from selecting some one of the four dairy types and sticking to it in preference to continually changing.

Question.— Does it pay the owner of a farm to introduce thoroughbred blood on his farm if he is to rent it?

Mr. Van Dreser.— By all means; he cannot afford to do otherwise.

Question.— How shall we know our best cows?

Mr. Van Dreser.— Study their individuality; also the conformation. You will soon learn the indications.

Question.— What is the best cattle tie?

Mr. Cook.— I believe the swing stanchion; it has the good qualities of the old rigid stanchion and with it the freedom of the cattle tie.

Question.— Is it advisable to dehorn?

Mr. Gregg.— Most assuredly; it is more humane than to leave them on; I prefer not to take them off till the animal is a year old; it can be done, however, when the calf is a few weeks old by using caustic, but I prefer the clippers at a year old.

Mr. Van Alstyne.— Cows are quieter when dehorned, and quietness tends to greater milk production. Cattle are frequently injured by the horns of others, but if dehorned they are as quiet as sheep.

Question.—At what age does a cow give the largest percentage of butter fat in her milk?

Mr. Van Alstyne.—At about four years old.

Question.— Is it advisable to put water in the stables for the cows? What is the best system?

Mr. Cook.— Most certainly; I believe it is the best investment that we ever made. I do not like the buckets as they are likely to get more or less foul. We use the trough and the cattle are watered two or three times a day.

Question.— What is the best way to rid a cow of lice in the winter?

Mr. Van Wagenen.—Apply some of the carbolic sheep dips; a mixture of two parts of lard and one of kerosene will be effective; it should be applied twice, so that any that are hatched after the first application may be destroyed.

Question.—Are milking machines feasible?

Mr. Cook.— They are; we have used them and were well pleased with their work; the chief objection to them is that they were difficult to clean.

Question.— Is it advisable to keep dry cows in the stable through the winter without exercise?

Mr. Witter.— I do not believe that it is. If the cow is giving milk and the conditions as to building and feed are perfect she may be kept in during the entire winter, but even then I think a few minutes in the open air on mild days would be beneficial.

Question.— My heifer freshened and only gave milk in the rear teats. Will she come out all right when she freshens again?

Mr. Cook.— I should have very grave doubts of it. If she has recently come fresh an operation may relieve her, but this is attended with much risk.

Question.— Which is most profitable to have, cows come fresh in the spring or in the fall?

Mr. Witter.— It depends upon conditions; I have found the fall more profitable; but you must have some succulent food, such as silage, and give as nearly as possible the summer conditions; I nearly doubled the gross returns by this method.

Question.— How much is it worth to keep a cow in milk for a year?

Mr. Cook.— It costs us now about forty dollars a year. This is a little less than formerly, as we have found it more profitable to use more home-grown feed and buy less, even if the amount produced is not quite so great.

Question.— Are apples any good to produce milk?

Mr. Brodhead.— They have some value if fed in moderation.

Question.— Would you recommend the use of sal-soda and a brush in cleaning dairy utensils in preference to a cloth?

Prof. Harding.— Unquestionably; there is no better way of doing it, and it will decrease the labor very materially.

Question.— Which do you consider the more profitable, cows or sheep?

Mr. Gregg.— It depends largely upon what the person likes; my own preference is for the cow; sheep require more constant care; one thing in favor of the sheep is that they destroy so many of the noxious weeds.

Question.— How long should cows be milked?

Dr. Smead.—As long as it is natural for the cow to secrete milk; this will vary with different individuals. Never force a cow to go dry against her natural tendency.

Mr. Van Dreser.— I prefer to have a cow in milk but ten months of the year; but if, as is sometimes the case, she is a persistent milker, it will be better to milk her nearly to the time of calving rather than to force her to go dry.

Mr. Purvis.— Milk her till she dries up. Some cows have such a strong tendency toward milk production that they cannot be dried off without injury.

Mr. Van Wagenen.— I prefer to have a cow go dry from four to six weeks; but if she will not go dry without being forced, I believe it is better to milk her continuously.

Mr. Brown.— A cow that is milked for ten months will give more milk than if milked the full year.

Question.— Will Mr. Cook describe his method of barn ventilation?

Mr. Cook.— We have what is known as the King system. By this system the impure air is taken from near the floor through a chute to the highest part of the barn, and there discharged. This chute will need to be a foot square for each six cows, providing each cow has 500 cubic feet of air space, which is all she can warm. One of these chutes is as good as several, provided this size is maintained. The intake flues should be much smaller, not over four inches in diameter and should be at intervening distances around the stable. They should open to the outside near the ground and be carried up inside to near the ceiling, where they discharge into the stable. With this system properly constructed, and the use of slides, there will be no trouble of maintaining an even temperature and an abundance of pure air. A test of our stables when the outside temperature varied forty degrees, showed an inside change of only eight degrees.

Question.— What is the best absorbent to use in cow stables?

Mr. Cook.— Use plenty of absorbents in the gutters and also nitrogen catchers. Nothing is better than a little South Carolina rock, but dry road dust is also good.

Question.— How should milk be cared for to secure the best results?

Prof. Harding.— It is a common observation that milk will keep but a short time after milking, especially in warm weather.

Souring is caused by those minute forms of vegetable life known to scientists as bacteria; these get into the milk after it is drawn, and break down the sugar of the milk causing the acid condition known as sour milk; some of these germs get in from the strainers and other utensils, but by far the greatest number fall into the pail during the milking process; they are also abundant in hay and straw, and the milk is often affected from this source. The remedy is cleanliness. Brush the cows before milking and wipe the udders with a damp cloth. The milk is often tainted by the odors from the stable and it should be removed as soon as possible. Having kept these germs out as far as we are able we should so treat the milk as to prevent the development of the few that will always be present. Thorough stirring is good, but the most effective manner is to cool the milk to a low temperature as soon as possible after milking, as this condition is unfavorable to germ development. Perfect cleanliness and a low temperature are the gist of successfully caring for milk.

Question.— How much light should a cow stable have?

Mr. Cook.— The first essential for the stable is sunlight. We do not appreciate the effect of sunlight, both on mankind and the animals as well. The direct rays of the sun will destroy the disease germs that thrive in dark places. I would, if possible, have the stable with a southern or western exposure. There should be at least thirty-six square feet of window space to each 5,000 cubic feet of air space.

Question.— What is the proper temperature at which a cow stable should be kept?

Mr. Cook.— I would have the temperature of the stable as high as the heat of the animals will maintain it and have a free circulation of air. This I have found to be between fifty and sixty degrees. A higher temperature can be had, but it must be at the expense of ventilation, and I would prefer that an animal would stand in a stable that was colder, if the air were kept pure. Five hundred cubic feet of air space per cow I consider ample.

Question.— Will Mr. Cook please tell us how he makes his cement floors?

Mr. Cook.— The concrete floor is unquestionably the best; it is more sanitary, durable and in the end cheaper than any other form; in building it I first place a layer of small field stones to the depth of several inches; these are packed firmly in place and after being thoroughly wet down the interstices are filled with a cheap cement; a finishing coat of the best Portland cement is applied before the first has dried; for this we use one part of cement to two of sharp sand; a board float is used instead of a trowel; the floor will be sufficiently rough so that the bedding will adhere well and there will be no danger of the animal slipping. The cost will range from five to ten cents a square foot.

Question.— Which breed of cattle is the most profitable, as to butter production, for the amount of feed they consume?

Mr. Cook.— I do not think it so much a matter of breed as of the individuality of the animal and the care that is given her.

Mr. Purvis.— I think that more depends on the man behind the cow than on the breed.

Question.— Does smutty corn have an injurious effect upon cows?

Mr. Witter.— It was formerly thought that it caused abortion, but recent experiments have proved that it is not injurious in any way.

Question.— What were the relative merits of the Ayrshire and Red Polled cattle at the Pan-American Exposition test?

Mr. Van Alstyne.— The cost of keeping the herds for six months was: Ayrshire, $140; Red Polled, $138. The net value of the butter product for that time was: Ayrshire, $218; Red Polled, $201.

Question.— What is the cause of cows giving curdled or stringy milk?

Dr. Chase.— Usually by lying upon the udder in the stable when the boards are too short. Those with a long udder are more apt to be so injured. It may also be caused by an excess of some kinds of food.

Question.— What will kill lice upon cattle?

Mr. Van Alstyne.— I prefer some of the carbolic sheep dips; two applications will usually rid them entirely; kerosene is liable to injure the skin; the healthy skin will secrete an oily substance that will largely keep them off. The carbolic dips also have a stimulating effect upon the skin that is beneficial; it may be used upon all kinds of stock.

Question.— Can a dairyman influence or control the offspring of his cows, with regard to sex?

Mr. Witter.— He cannot. This has very wisely been placed beyond our control.

Question.— What breed of cattle would you recommend to make the best all-purpose cow?

Mr. Gregg.— I can answer that question easily enough. Don't be too particular about some breed, but be sure you have a dairy cow. No matter of what breed, the general-purpose cows are not fitted for the dairy; they are up and down and are a humbug every day in the week. I don't believe that any one here wants a general-purpose cow; if he does, select them from a farmer's standpoint; select a cow having large teats, then always use a beef sire. Such a cross will give you beef, not milk. But don't expect to get beef and butter in the same hide. It is a will-o'-the-wisp.

Question.— Would you advise crossing of two distinct breeds, such as Holstein and Jersey, for a better quality and quantity of milk?

Mr. Van Alstyne.— No, no! Never do that. Many mistakes have been made by crossing the Jersey with the Holstein. Sometimes we get fairly good results. A less flow of milk, but higher per cent of fats; but the next cross will be an entire failure. No, I am not in favor of crossing even the Jersey and Guernsey; such a course will result in time in degenerating the animals to the original type of native cows. If you want to improve the quality of Holstein milk, do it through a higher quality of sire. I have seen so much of such breeding and its results that I am wholly opposed to it.

Question.— What is the best breed of cows for butter production?

Mr. Smith.— The best breed I know of is the one that will make the most butter at the least cost. The man who starts out with the belief that some one breed is better than all others will find himself mistaken.

Question.— Which breed of cows pay the best, all things considered?

Mr. Van Dreser.— If a man is going into the dairy business to make it profitable, he must have a dairy type of cow. There are four prominent breeds, viz., Jerseys, Guernseys, Holsteins and Ayrshires. Some of the Red Polls and Brown Swiss are also good dairy cows. It will all depend on the use a man wanted to make of the milk, his market and his preference. I cannot answer the question further, except to say he should select the breed he is most in touch with.

Question.— Which is the best breed, Jersey or Holstein, and which will produce butter at least cost?

Mr. Cook.— It all depends on individuality. There are some fine Holsteins and some miserably poor Jerseys. But, by all means, don't mix breeds. Stick to one breed; either one.

Question.— Is it better, all things considered, for the dairy cow to be dry one or two months?

Mr. Eastman.— Two months.

Mr. Ennis.— I have been making some experiments in that line and find I can get as much from my cows in ten months as in eleven; but if cows freshen in the fall, they must be well housed, cared for and fed some succulent food like silage.

Mr. Eastman.— I do not think a cow would last very long if she gave milk constantly.

Question.— What is the proper way in which to dry up a cow? Shall we milk her out every day or not milk her at all?

Mr. Gould.— What do you want to dry her up for?

Mr. Smith.— The individuality of the cow will decide the question. We cannot make on iron-clad rule for all cows. Some will dry up, whether you want them to or not; while others will persist in giving milk, no matter how much you want to dry them off. If a cow is nearing the freshening period and is still giving milk, it were best to milk her out and allow her to go right along. It will be obeying one of nature's laws to do so.

Question.— How many gentlemen present have experience in laying cement floors? How do they compare with plank?

Mr. Ward.— Is there any one present who has had experience with cement floors?

Mr. Woodward.— I have. If we want to make a barn or stable floor, we use cement, or if we want a bar post, we use cement. In fact, we do not use plank any more. But the cement should be properly made with good, clean, sharp sand. Have a good foundation made of finely broken stone and cement; then make a cement of one part cement to two parts of sand; when the cement finish is on, rough it with an old broom handle to prevent the cattle or horses from slipping on it. When you have such a floor it will need no repairing and will last forever.

Mr. Ward.— I was in one of the best barns in this State recently where the floors are all cement and the King system of ventilation in force, and I could blindfold a man and lead him through that barn, and will guarantee that he cannot tell when he passes off or on the cement floors. Everything is perfectly clean and sweet.

Question.— How should the cows be watered in winter?

Mr. Van Dreser.— We have a trough in the stable where cows can get water at any time; water is constantly running, but I think I would prefer buckets; some of the basins are all right, others are not. It will not do to turn cows out of doors in zero weather.

Mr. Witter.— Eighty-seven pounds, on the average, in one hundred pounds of milk is water, so that it is very necessary that cows have all the pure water they will take and just when they want it.

Mr. Rice.— I know a dairyman who keeps forty cows. By introducing water buckets into his stables in winter he increased the flow of milk thirty quarts per day, or nearly one quart per cow, on the same feed.

Question.— How many times daily should a cow be watered during the winter season?

Mr. Gould.— A cow will drink from eighty to one hundred and forty pounds of water, according to her temperament, in a day. As a rule, I think that twice a day is enough; better than to have water before them all the time.

Mr. Smith.— Our cows at the Station are watered twice a day. We find we can get as much benefit in that way as when water is left before the cows all the time.

Question.— Will it pay to start a co-operative creamery here (Orleans county)?

Mr. Dawley.— As a general thing I believe that it pays a locality where some particular branch of agricultural endeavor has been specialized to hold pretty closely to that specialty. Those communities, the world over, which are noted for the production of some one commodity at its best, as a general thing, are more successful than communities where the interest is too greatly diversified. At the same time the old adage of not carrying all the eggs in one basket applies. We must take into consideration all the facts in the case and, if we find that our present system of work is depleting the fertility of our soil, it will probably be well to change our methods and practice some system of agriculture which recognizes the animal and the value of its excrement. Where cows are numerous and a co-operative sentiment prevails the creamery has been one of the greatest benefits imaginable. The results financially have been so very satisfactory in favored communities that other neighborhoods have become enthused and have started creameries before there were cows enough within a given distance to warrant the undertaking. No creamery should be started, unless at least 400 cows are pledged. A creamery without patronage is bound not to be successful. People seem to forget that a creamery is not a producer of milk, but simply the means of marketing it, and that a creamery in any community which is doing an unsatisfactory business from lack of patronage is an unprofitable investment. Let me impress upon you the fact that you should do your own organizing without the assistance of the professional creamery agitator. Scattered all over the State we find creamery buildings, completely equipped, which have been built at local expense by these so-called "creamery sharks" who have gone about enthusing the farmers, organizing companies, building and equipping creameries with, in many instances, worthless machinery at about twice as much as it would have cost the local committee to build these concerns without the help of professionals. It is true that some of these "promoted" creameries are doing good work, but their success is due to subsequent handling and, in many instances, the company has been seriously handicapped by the excessive first cost of the plant, but statistics show that a very large proportion of the defunct creameries were built by professional organizers. In the Northwest these creamery promoters used to have a big celebration, sometimes a railroad excursion, a banquet and a general warming up. The farmers were enthused, the stock subscribed and the plant built without taking a cow into consideration in the least, and the concern was usually a failure. Some bright Western man said, "that the creamery agitator could build these creameries on farmers' autographs, but that it took cows to run them." Such co-operative creameries should stand in a community as a colossal monument to the gullibility of the builders. On the other hand, one which is organized locally, built and equipped by careful painstaking farmers, who purchase their appliances of some near-by manufacturer of standard dairy machinery, and who equip it with the best separators, churns and workers that can be found, usually turns out to be an institution that is a direct benefit to the community and will stand as an enduring evidence of prosperity. It is much better to have no creamery at all than an unsuccessful one.

MILK AND ITS PRODUCTS.

Question.— How can milk best be handled where it is kept on the farm?

Answer.— By all means get a hand separator. The day of the creamery is passed. The separator requires no more labor, and it does more satisfactory work.

Question.— What is the difference between the Babcock test and the churn test, and why?

Mr. Rice.— The Babcock test shows the amount of butter fat in the milk. The churn test shows how much you are able to get out. The former shows the pure fat, while in the latter there is quite a percentage of moisture.

Question.— Why do tests vary so much?

Mr. Rice.— It may be from inaccurate testing. The test will be higher as the cow advances in the period of lactation. It is also affected by weather conditions.

Question.— Do you advise taking milk in a cheese factory by the Babcock test?

Answer.— It would seem to be the only fair way. If you are producing a richer quality of milk than your neighbor, it is no more than right that you should be paid accordingly.

Question.— Is there any penalty for watering milk that is taken on test?

Mr. Van Wagenen.— I should think it would be much like the farmer who watered the sap before he boiled it down.

Question.— Can the butter maker make as good butter from cream gathered from all kinds of separators as when the milk is brought to the creamery and separated there?

Mr. Rice.— In such a case the butter maker must work against very unfavorable conditions. Such cream cannot be ripened uniformly, and without the best of care there will be a loss of butter, as well as a lack of uniformity in the quality.

Question.— Why do we sometimes have to churn for hours? Has feeding anything to do with it?

Mr. Cook.— The trouble is undoubtedly due to the improper ripening of the cream. The cream should be cooled to about fifty degrees and kept there till you have enough for a churning, then ripen it together. Feeding does not affect it.

Mr. Witter.— Years ago I heard it said that there were witches in the cream; to get them out a horseshoe was heated and dropped into the cream. The trouble comes from breaking some law in caring for the cream.

Question.— Does it pay to make your own butter?

Mr. Van Wagenen.— I do not think so, unless you have exceptional facilities for both making and marketing. As a rule the creamery butter is of a better quality and commands a higher price.

Question.— Where does the "renovated butter" come from that floods our market? Is it another name for oleomargarine?

Mr. Rice.— Renovated butter is made up of butter, good, bad and indifferent, gathered from different sources. This is melted together; many of the impurities are removed, enough good butter is added to give it the appearance and flavor desired, and it is placed upon the market. While fairly good at first, it rapidly deteriorates. I have been told that oleomargarine is also being used to some extent, but I have no proof of the fact.

Question.— Which should the farmer patronize, the creamery or the shipping station?

Mr. Shepard.— I believe it better for the farmer to send his milk to the creamery, and have the skim milk to use, rather than ship it.

Question.— Why have not the dairy products advanced in price proportionately with that of grain?

Mr. Witter.— I believe that these prices are very largely fixed by the law of supply and demand.

Question.— What will give the farmer the best results in the end, patrons' factories or the shipping station?

Mr. Fuller.— It is hard to say, as these go hand in hand in this section. Where the cheese factories are only run a part of the time there must be some market for the winter milk, and this the shipping station affords. I think that the continual shipping would tend to decrease the fertility of our farms.

Question.— What is the cause of butter not coming?

Mr. Rice.— It is difficult to say, as it might be due to several causes. It might be that the cream was not of proper temperature. It might also be due to the food of the cows. Certain foods have a tendency to make the butter hard, others to make it soft. If hard, it will not come as readily. Another frequent cause is the imperfect ripening of the cream, and still another is feeding to excess certain foods, such as potatoes.

Question.— What is the cause of milk becoming ropy?

Prof. Harding.— This is due to the growth of a species of bacteria, which are formed largely upon the surface. The sticky substance with which they are covered causes them to adhere and form the ropy condition. As a preventive cleanse all dairy utensils thoroughly with boiling water.

Question.— Is the use of soap or soap powder on dairy utensils injurious?

Prof. Harding.— It is not, if the utensils are thoroughly rinsed. It is quite necessary to use some such preparation to cut the casein before the can can be well cleansed.

Question.— Would you feed skim milk to a cow giving milk?

Mr. Witter.— Yes, unless you have young stock, for which it is an ideal food; at three weeks of age the calf should have a few whole oats fed after the milk.

Question.— What are the relative values of whey and skim milk?

Mr. Wing.— I should say that the skim milk was ten times as valuable.

Mr. Witter.— Farmers should realize that they are selling fertility when they sell milk. Careful analysis has shown that a ton of butter contains only sixty cents' worth of fertility, while in a ton of cheese its value is twenty dollars.

Question.— Suggest some method for improving the quality of milk as to cleanliness.

Mr. Gould.— Lots of hot water and live steam.

Mr. Smith.— I do not want to enumerate some things the farmers do who take milk to the creamery. Doubtless there are no such farmers here. But there are those who draw the skim milk or whey home, and leave it in the milk cans till they get ready to feed it; then when the cans are empty there is no hot water in the house, and so the cans are only rinsed or washed with lukewarm water. Such treatment does not destroy a germ or bacteria, but leaves them in the can to inoculate the next mess of milk. Use plenty of hot water at any time, remembering that the making of good butter begins on your farm, not on your neighbors'.

Question.— Which will the farmer derive most benefit from, pasteurized or unpasteurized skim milk?

Mr. Smith.— Pasteurizing milk adds to its keeping qualities and kills all bacteria, especially those of tuberculosis.

Question.— Does it make any difference in the test of cow's milk according to her age?

Mr. Smith.— No. How many of you think you can feed fat into a cow's milk? One hand went up, the farmer saying, however, that he knew that scientific men were against him. He was quite sure he could, and had done it, however.

Mr. Smith.— Every cow has a born individuality when she has been reared properly from calfhood and fed properly. You cannot increase the fat in the milk; it may increase a trifle one day, but it decreases the next. Professor Wing, of Cornell University, took a herd and kept it one year, weighing and testing the milk every day during the year; there were ten cows, and records were kept for a year; there was a slight increase of fat in the milk of some of them, while others did not increase at all, and one that fell off in her percentage of fat. But there was an increase in the milk flow. If one makes a radical change in the food of a cow, he will change her fat; she may increase it slightly or she may go down; but after a time she will get back to her old figures. Ordinarily a cow that is five or six years old is at her best for milk production.

Question.— What is the difference in the amount of salt and sweet butter one pound of fat will make, and is it a fact that some sweet butter goes into the manufacture of oleomargarine?

Mr. Smith.— I do not remember just what the difference in the amount of sweet or salt butter a pound of butter fat will make. There will be some, however, as salt when added to butter or cheese releases a certain amount of water. If the butter were not salted, if the same per cent of moisture were left in it that was in the salted sample, there would be a greater weight, because water is heavier than butter fat. I do not believe that any sweet butter goes into the manufacture of oleomargarine. Oleomargarine is principally caul fat, cotton-seed oil and some other vegetable fats and does not cost to exceed ten cents per pound, and at the price it is sold to the consumer, produces a profit of fully ten cents per pound.

Question.— Can butter fat be put into milk?

Mr. Smith.— The majority of farmers, if asked that question, will say that it can, and I am not prepared to say it cannot. It will all depend on the condition of the cow and how she has been kept. If, when she was a calf, she was properly reared and fed up to the period of motherhood, no amount of extra food or difference in food will add a permanent increase of butter fat in her milk. Experiments all go to prove this statement true. If, by food additional butter fat can be fed into milk, we might go out and pick up any old red scrub of a cow and make one of the highest butter producers of her. There would be no need, then, of buying highly-bred pedigreed stock for dairy purposes.

Question.— In what way are we to be benefited by co-operative creameries?

A Farmer.— If the farmers would have confidence to combine, there is no doubt that co-operative creameries would be advantageous, but, so far, it seems difficult for them to do so here.

Question.—Is the automatic separator, advertised by a Western supply company, a success?

Mr. Smith.— I have never seen such a separator nor heard of it. My advice would be not to buy something you know nothing about. There are separators enough having well-established reputations. Buy one of those; there are none better.

Question.— Do you recommend the gravity dilution method of separating milk?

Mr. Witter.— The aquatic separator is not a separator at all. It has been condemned by all the experts in the State, and at nearly all the institutes. Any man who buys one expecting to get all the fat out of his milk will be disappointed. He never can do it.

Mr. Rice.— Even if these so-called separators would skim clean, diluting the milk with a large volume of water about ruins it for feeding purposes. If it is used at all, the water must be pure and sweet, otherwise the quality of the butter will be impaired. Then, too, it is an awful imposition on the calf to force it to drink a pailful of water with every one of milk it drinks. There is but one real separator, and that is the centrifugal, and it is the only device that will skim all the fat out of the milk. A large number of experiments were made with the aquatic cans (that is all they are) by Professor Wing at Cornell University, results of which were published in a bulletin, which can be had by writing to the Cornell University Experiment Station.

Question.— The *New York Farmer* says that reports from various sources tell of the decreased consumption of cheese in this country. Are these reports authentic? We have heretofore considered the consumption of cheese as increasing in this country.

Mr. Smith.— I don't know where the *New York Farmer* obtained its information, but I do know that the statement is all wrong. Our home trade has increased the price of cheese largely within a few years. At Cuba, Allegany county, a large trade in home consumption cheese has been recently built up, the cheese being small. A few years since no such trade was known. We have reason to congratulate ourselves on our exhibits of cheese at the Pan-American Exposition at Buffalo last year and on our increased home consumption of it.

Question.— What causes red spots in cheese?

Mr. Smith.— It is a bacteria. As a rule when all the milk utensils at the farm and factory are kept perfectly clean these red spots are never seen in the cheese.

A Farmer.— They get into butter here.

Mr. Smith.— I have never seen any of them in butter, nor ever before heard they got there. I would very much like to see them in butter. They do not develop so that they can be detected with the naked eye till the cheese is eight days old. But they may be seen through a strong glass when the cheese is but five days old. The same is true of what is known as "fruity flavor" in cheese. It is caused by some bacteria, and does not develop till the cheese is a week or ten days old. The bacteria which causes the "fruity flavor," however, is not of the same species as is that which causes the red spots.

Question.— Would milk that has been frozen test the same as it did before it was frozen, if it were thawed and again tested?

Mr. Smith.— Freezing does not change the per cent of fat. It is the water in the milk that is affected. If frozen milk is thawed and well mixed, there would be no loss of fat. If, however, some of the water was taken out, there would be an increase of fat.

Question.— What is the best and purest brand of salt to use for butter making?

Mr. Smith.— There are several American brands of salt that are what might be termed absolutely pure. The American people are now making a number of brands of salt, all of them better than any of the imported brands, because they dissolve better. Then, ofttimes, imported salt absorbs vessel odors when in transit; these odors are imparted to butter.

Question.— Does it take a longer time to churn cream that has been separated than it does from the old way of skimming pans?

Mr. Ennis.— No. I have churned cream raised by all methods and find that when cream is properly ripened, if there is any difference, separator cream will churn most easily, while cream containing forty per cent fat will churn more quickly and exhaustively than will twenty-five per cent fat cream.

Question.— How old should cream be from the separator before churning it?

Mr. Ennis.— I like to churn the cream at about the age of twenty-four hours. It may be properly ripened in that time, and be made ready for churning. That was our practice, as a rule, at the Pan-American Exposition last summer. I would churn it just as quickly from the separator as possible.

Question.— Does the quality of the cheese vary with the richness of the milk, or will six per cent milk make better cheese than will three per cent milk?

Mr. Smith.— It will; a skimmed cheese is almost flavorless, while the higher the per cent of fat, if there is casein enough to hold it, the richer will be the cheese, because it will be more moist, and, therefore, softer.

Question.— What is the cause of the sweet coagulation of milk?

Mr. Smith.— It is caused by some bacteria, but we do not know what it is, although bacteriologists have been working on the problem a long time to find out, but have not yet succeeded.

Question.— What kind of aerator should be used to give best results in cooling milk?

Mr. Smith.— Some form that runs the milk in a thin sheet over a cool surface; it will thus liberate odors and at the same time cool it. There are a number of aerators that are good.

SILOS, SILAGE AND CORN.

Question.— Why are farmers so slow to build silos?

Mr. Van Alstyne.— I do not think they are. Many have been built the past season all over the State.

Question.— Should a man borrow money with which to build a silo?

Mr. Witter.— I have a great horror of debt, and, as a rule, would avoid it, but for an energetic man keeping stock it might be advisable if he can borrow at a low rate of interest.

Question.— Is there any patent on the ground silo? Is the stave silo preferable to the other forms of round silo?

Mr. Van Alstyne.— There is no patent on the silo, but there is on the different kinds of doors; either form may be good or bad. Three things are essential: It must be strong, tight and durable.

Question.— Would you advise the single or double boarding for a silo, and would you use tar paper between?

Mr. Fuller.— I would always double board, but I prefer the parchment to the tarred paper. I believe it to be more durable.

Question.— Which is the better lumber for a silo, spruce or hemlock?

A vote of the audience was decidedly in favor of hemlock.

Question.— Which is the better and cheaper silo to build?

Mr. Witter.— Three things are essential: It should be high for pressure and of sufficiently small diameter to be fed off at the top often enough to prevent its spoiling, and it should be tight and strong. If these conditions are had, the shape or form is immaterial. Personally, I prefer the octagon shape.

Question.— Is it practical to make the corners of a square silo rounded?

Mr. Cook.— It can be done, but it requires careful work; if there is any chance for the air to enter, it will cause a loss. Great care must be taken to make it perfectly tight.

Question.— Is silage a profitable food for the growing of young lambs?

Mr. Witter.— It is a part of the ration; it is too carbonaceous to be fed alone and the grain food should be such as will balance it; it is valuable for its succulence, but the lamb will not eat as much in proportion as the ewe.

Question.— Is it injurious to cows to feed frozen silage? How can freezing be prevented in an outside silo?

Mr. Fuller.— I do not think that silage is injured by freezing, but I would never feed it while in that condition.

Mr. Cook.— From the structure of railroad water tanks I got the idea of thicker staves, my experience leads me to believe that if the staves are three inches, or even two and three-quarters thick, the danger of freezing will be much less.

Question.— Does silage taint the milk or butter made from feeding it? When should it be fed?

Mr. Cook.— Poor silage will, if fed just before milking; but even if it is slightly tainted, as so much is this year, it can be safely fed in moderation immediately after milking. The quality of silage may be improved by cutting the corn and allowing it to wilt a little before filling the silo. We should grow some variety that will grow to a reasonable maturity. I prefer the dent variety, but if our season in Lewis county is too short for that, grow the earlier kinds.

Question.— Will it do to plant the cow pea with corn for silage?

Mr. Gould.— It will not in northern Ohio, as the plant is out of its latitude. I should think the same objection would hold good here.

Question.— What is the cause of the blue mold in silage that so often causes the death of horses? The silage was dent corn with a little sweet corn on top. The sweet corn only was affected.

Mr. Van Alstyne.— The mold usually appears on corn that is too dry. I should infer that your sweet corn was a little riper than the other. It is an established fact that moldy silage will cause spinal meningitis in horses; no other stock seems to be so affected.

Question.— What is the best crop for silage except corn?

Mr. Witter.— One of our institute men has tried sunflowers planted with the corn; the weather conditions were such that the sunflowers were the main crop; they were put in the silo with what corn there was and made good silage. Others have tried the cow peas with the corn. I believe that the best results will be had by growing them separately and putting them in together. Mr. Dawley put alfalfa into the silo last fall, and has done so before, with good results.

Question.— Does the acid in silage injure the teeth of animals?

Mr. Cook.— We had a cow that was fourteen years old when we disposed of her, and her teeth were in good condition, and she had eaten silage for years. I prefer to feed it twice a day rather than once. We can unquestionably get more milk and get it cheaper from feeding silage than from feeding any other food.

Question.— In feeding silage to milch cows is it safe to feed only oil meal?

Mr. Witter.— It is not. Oil meal is a very concentrated food and should not be fed to exceed two pounds a day per cow.

Question.— Does the blower used in filling silos cause the silage to dry out in the center?

Mr. Cook.— I think not; we have used the blower for several years and it has been very satisfactory.

Question.— Do peas and oats make good silage, and should they be put in without cutting?

Mr. Cook.— They are excellent, but will not keep well unless cut.

Question.— What is the best silage corn?

Mr. Cook.— Some of the dent varieties in preference to the flint; they can be matured sufficiently for the silo in nearly all sections of the State. The flint is liable to have too great a proportion of ears for the best silage, and it will not grow as great an amount of feed to the acre as the Pride of the North or some similar kind. I do not like the sweet corn, as I have never been able to get the results from this that I can from the common corn.

Question.— Which is best, to plant silage corn in hills or in drills?

Mr. Witter.— It depends upon local conditions; if the ground is full of quack or deep rooting weeds row it both ways; if fairly clean, I believe we can get more corn in drills than in hills. It is more easily harvested when in drills if a machine is used.

Question.— Is there any benefit in sowing clover seed on corn at the last cultivation, to plow under the next spring?

Mr. Van Wagenen.— It depends upon the amount that we can grow. In this climate, where the frosts come so soon after the corn is cut, I doubt if it would get sufficient growth to be profitable. Rape, rye or the cowhorn turnip will be more likely to succeed; these add vegetable matter, but no nitrogen as in the case of the clover.

Question.— Is it advisable for the farmers of this section to save their own seed corn of the dent varieties?

Mr. Witter.— Yes, if your seed is pure and you select those ears that are well matured. I believe that the plant that has become acclimated will do better than one introduced from elsewhere.

Question.— What corn would you plant for the silo?

Mr. Van Wagenen.— I should plant the largest variety that we can bring to a reasonable state of maturity; with us it is the Leaming or the Pride of the North. State corn contains too much grain in proportion to the fodder for the best results.

Question.— Which is more profitable, deep or shallow plowing for corn?

Mr. Van Alstyne.— I prefer to plow about two inches shallower than for other crops. The corn roots feed near the surface.

Question.—At what time should corn be cut for the silo to secure the greatest feeding value?

Mr. Van Alstyne.— For the best silage the corn should be cut just as it begins to glaze. Such a season as the past has been it may be allowed to mature a little more.

Question.— When would you advise planting corn?

Mr. Dawley.— While the early planted corn did the best this year, I would prefer, as a rule, to defer planting till about June first, giving the land the additional tillage rather than planting earlier and working the land after the crop is in.

Question.— Do you prefer corn planted in drills or in hills?

Mr. Dawley.— Where corn is planted in drills the weeder which I use will not take out as much as when it is in hills. I prefer to have the seed about two inches down, with an inch of dirt over it; this depression will be filled as the weeder is used and some weeds will be covered in this way.

Question.— What kind of a cutter do you prefer for silage?

Mr. Dawley.— I use the Blizzard and the shredder; I wish to have the silage cut as fine as possible.

Question.—Is it advisable to paint the silos with tarred paints?

Mr. Cook.—I do not think so. I prefer a paint that soaks thoroughly into the wood rather than one that simply forms a coating, as the moisture is sure to get in back of it and then will be slow in drying out.

Question.— What are some of the reasons why farmers should have silos?

Mr. Van Alstyne.— Chiefly on the ground of economy, for three reasons: First, all the plant is made available for food; second, this food has an additional value from its succulence; third, the corn crop can be handled at less cost in the silo than in any other way.

Question.— If you had plenty of good clover hay to feed, would you advise building a silo?

Mr. Cook.— I would; there is this additional value in silage, it has succulence.

A Farmer.— I have never tried it, but I know of a silo that has been twice filled with clover. The first experience was unsatisfactory and there was much loss from heating; the second year the clover was cut while green and put in the silo at once, being wet down as filled. It came out in first class shape.

Question.— What is the comparative value of corn silage and corn ground and fed with the shredded fodder?

Mr. Witter.— Experiments have shown that the loss by the latter method is many times as great, even under the most favorable conditions.

Question.— Does the grain of corn retain its nutritive value after being put in the silo?

Mr. Van Alstyne.— It loses a little, but the remainder is made much more digestible.

Question.— Can silage be kept over from one season to another and more put on it when the silo is refilled?

Mr. Van Alstyne.— We have done it with perfect success.

Question.— Will not good silage and alfalfa reduce our feed bills two-thirds?

Mr. Van Alstyne.— Most assuredly; it has been proven that with good corn silage cattle need two pounds less of the protein foods than when fed the dry stalks and corn.

Question.— Would you advise sowing a cover crop in corn? If so, what is best?

Mr. Witter.—Always; what you should sow depends upon the locality. I sow just before the last cultivation, two parts of Dwarf Essex rape and one of flat turnip, using about three pounds of seed to the acre. This principle of cover crops we must all come to, sooner or later. Mr. John Gould of Ohio, a dairyman of national reputation, has grown corn on one field for fourteen years in succession, with increasing yields, by the use of cover crops only.

Question.— Is it economy for farmers to raise corn for the crib rather than the silo?

Mr. Witter.— On general principles, no! The silo is the ideal way of preserving the crop; it can be done cheaper than in any other way, and with only about one-third the loss.

Question.— Which form of silo is the best? How do you prevent silage from freezing?

Mr. Van Wagenen.— After twenty years experience I have come to the conclusion that the modern round silo, one thickness of staves, built of good material and well hooped, is the form to adopt. Place it outside the barn, but in some position where the contents can be easily and conveniently fed to stock. Make the silo to supply your needs; not too small nor too large; it is better to have two small ones than one large one. For forty cows two silos holding about 100 tons each would be preferable to one holding about 200 tons, because in the former a certain thickness of silage may be fed off each day, while it would be difficult to do so in a silo having so much surface. I do not think that the freezing of silage injures it much.

Mr. Witter.— Have the silo strong and tight. I built one in 1889 having a capacity of eighty tons, at a cost of thirty dollars, but I had all the timber on my own farm; it has served me well since and is in good condition; it is square, with the corners cut off on the inside; but, no doubt, the best form of silo is the round one; have it deep, not less than twenty-five feet, while thirty feet is better, and so plan it that you can feed off the whole surface each day to a certain depth, to prevent loss by mold; have good material and see to it that there is not a poor stave in it; hemlock is good material, if sound, for a silo.

Question.— Which is the cheaper, the round or square silo?

Mr. Gould.— There is not much difference, if both are well built. Either will cost from ninety cents to one dollar per ton capacity.

Mr. Dawley.— Better build the round one.

Question.— What interest will a silo pay?

Mr. Smith.— Professor Voorhees made an experiment with silage corn and that cut and fed in the old way; the loss in feeding value in the silo was but five per cent.; that in the dried corn stalks thirty-five per cent., while the flow of milk from the silage food was fifteen per cent. more than from the husked corn. When corn is left out in the field there is a constant loss going on while there is but very little in corn silage.

Question.— What is the best material for a silo?

Mr. Witter.— If we get the clear, white hemlock we will have a good silo. Some of the other woods would last longer, but would be more expensive.

Question.— Is it advisable to paint the inside of silos with coal tar?

Mr. Dominick.— I don't know; I painted the inside and outside of my two silos; have never tried one without painting it.

Mr. Gould.— I know of no better paint than one of one part gas tar and two parts gasoline. I painted my first silo on the inside. If, however, I were to build another I would paint it on the outside. Some objections are made against painting a silo on the inside because the lumber dries out on the face side but not on the back, so rots from that side.

Mr. Dawley.— Some of the wood preservatives that penetrate the wood are far better than either paints or tar preparations.

Question.— Do you advise the building of silos for a small dairyman?

Mr. Witter.— Possibly, under certain circumstances, if one has a small dairy, say a half-dozen cows, if he grows turnips or mangels, he might get along cheaper than with a silo; but with a dairy of a dozen cows or more, the silo is the best.

Question.— What are the advantages of cutting corn for silage against putting it in whole?

Mr. Smith.— Convenience, if nothing more, in putting in and taking out the silage. Cut silage is much easier put in and taken out than is whole silage, and more of it may be put into the same space than of whole silage, and the air may be easier excluded. The best, sweetest silage that I ever saw was that from whole corn. Mr. Gordon of Clinton county had it. I do not think that the freezing of silage injures it much if the frozen silage is raked into the center of the silo and left to thaw out.

Question.— What is the comparative value of dry corn fodder and good silage?

Mr. Woodward.— If the dry matter is considered, silage is worth the most. Fifty-five per cent. of feeding value of a corn plant is in the stalk, as against forty-five per cent. in the ear, and forty per cent. of the value of that stalk is below the ear, and that is the part usually lost in dried corn stalks. If you have corn stalks in your barn now, or standing in the field, you cannot find a particle of sugar in them. They are not worth any more than so much sawdust. I would rather have a ton of silage than a ton and a half of the best cured corn stalks ever put up. Dried corn stalks have lost their digestibility. They may be shredded or ground up so that a cow will eat them if she can do no better, but eating, digesting and assimilating are other affairs. If corn stalks are put up in very large shocks the stalks inside may not be very badly injured, but they do not compare at all with good silage.

Question.— Does silage take the place of roots?

Mr. Gould.— Yes, and about three times more. A hundred pounds of good silage is worth three times as much of roots. I don't grow them, because I can pump water through the agency of a windmill much cheaper than through roots.

Question.— How much silage should be fed a cow per day?

Mr. Van Wagenen.— I would feed at least five to eight pounds of hay, four to six pounds of grain and from forty to fifty pounds of silage. Jerseys weighing not to exceed 800 to 900 pounds had eighty pounds of silage at the Pan-American Exposition.

Mr. Cook.— It would depend on the cow, somewhat. A ration of thirty to forty pounds per day, properly balanced with some clover, wheat bran or gluten, will be found about right.

Question.— Is square cut corn as good as shredded for silage?

Mr. Dawley.— The shredded is best; it packs closer, keeps better and is eaten cleaner.

Question.— Having silage to feed, when is the best time for a cow to freshen?

Mr. Smith.— In the fall. Careful experiments go to show that a cow coming fresh, say in October, will give 1,000 pounds more milk during the year than if she freshened in the spring.

Question.— Does the binder twine in silage injure cattle which eat it?

Mr. Gould.— I don't know; some men cut out the twine, some do not; I have never heard of any injury to cattle from binder twine mixed with silage.

Mr. Wing said that if a cow ate too much binder twine it might result in the formation of a ball in the stomach of the cow and eventually cause her death. But she would have to eat a good deal of it to bring about such a result.

Question.— What variety of corn is best for the silo?

Mr. Witter.— That variety which will produce most and properly mature sufficiently on your farm; some one of the large dent varieties is best. Pride of the North is one of them, Leaming is another; both are good yielders, but Pride of the North, as I grow it, is about ten days earlier than Leaming. There are other varieties being grown in other parts of the State, but I do not know as they are any better than those I have named. But whichever you choose for the silo, grow but one variety; do not mix two or more sorts in the silo.

Mr. Cobb.— Pride of the North does best with me; it is a great yielder, and matures early enough.

Question.— What would you say of the utility of taking off the ears of corn and putting only the stalks into the silo?

Mr. Cobb.— I take off about one-half the ears and cut the balance, ears and all, into the silo. I am convinced that silage may be too rich in corn; so that if we feed as much of it as we ought, the cows will lay on too much fat; I would reduce the corn factor for that reason.

Question.— Can corn grown thickly on the ground be made into satisfactory silage by feeding proper grains?

Mr. Cook.— No, sir; but it can be improved upon by partly sun-drying it. I saw corn treated in that way on Governor Morton's farm. It was a wet time, so that all the corn could not go into the silo when cut. It made very good silage, but not as good as it otherwise would have been. We put in 600 tons of silage last year, all of which was dried out a little. There is a certain amount of moisture necessary to make good silage, but just how much I do not know. I would not stop for the rain or dew, however, and would cut the silage as fine as I could.

Question.— Which will be the most profitable, to pick the ears of sweet corn and carry them to a canning factory, or feed to the cows?

Mr. Smith.— I don't know; that is another question, that to answer one must know what the conditions and the prices are.

A Farmer.— From sixty to sixty-five cents per hundred is the price received for the ears. It will pay better to feed the ears to the cows.

Question.— Which is the better way, to spread manure for corn before plowing or after?

Several men answered "before," while some said "after." Mr. Smith said he would vote with the majority, "before," because when manure or green crops are plowed under, fermentation begins, and the vegetable matter assumes the form of humus.

This humus holds moisture and makes fertility in the soil available.

Question.— Is seeding down with corn a profitable method?

Mr. Smith.— What do you say to that, farmers?

Several farmers said that they had sown grass seed among the corn rows, and did it very profitably.

Question.— How deeply would you plow for corn?

Mr. Witter.— Plow as deeply for corn as any other crop.

Question.— Do you advise the putting of water in a silo if the corn was in the right stage of ripeness?

Mr. Witter.— I certainly would not. If it is dry so that the leaves will "rustle" I would add water; if it were in the right stage of ripeness no water should be added.

Question.—At what time of year should we plow for corn or potatoes?

Mr. Witter.— I always plow in the spring, from the first to the fifteenth of May for corn, and aim to turn under as much grass as I can. Such grass decays most rapidly in June and July, and will generate heat at least eight degrees higher than will old ground plowed at the same time. It would be equivalent to removing your farms fully 500 miles south. Potatoes are wholly different, and do not require the heat that corn does. Possibly it would be better to plow potato ground in the fall, depending on the soil and other conditions.

Question.— Should the cob be ground with the corn?

Mr. Witter.— The cob carries about all the mineral matter there is in the corn. If the cob is ground very fine it is of value, because of its mineral worth. Then, too, it helps to lighten the meal and makes it digest much easier.

Question.—At what length ought corn to be cut for silage?

Mr. Ennis.—I cut it about half an inch. It is quite immaterial about the length, so long as the air is excluded from it in the silo.

Question.—When filling the silo, should the silage be well trodden?

Mr. Ennis.—My experience has been that a little more silage may be put into the silo if it is thoroughly trodden.

Question.—Does it make any difference how the summer and winter silo is built?

Mr. Ennis.—Not a bit; build them all alike; the exclusion of air is the main feature to be considered when building a silo, whether for winter or summer feeding.

Question.—What kind of a tool should be used for the shallow cultivation of corn after it is too large to harrow?

Mr. Gould.—We use what is known as the "scuffle hoe;" one with shovel teeth that only cut to about the depth of an inch.

Question.—If sod ground is not available for corn, would you advise manuring in the corn hill or drill it in?

Mr. Gould.—It is too late in this generation to manure corn in the hill. Put the manure all over the ground so that the corn roots can have an even chance. If the manure is put in the hill and dry weather comes on but very little benefit will be derived; but as a rule injury to the corn instead, from the fact that the manure will burn up from heat and thus injure the corn roots.

Question.—As I am obliged to plow sod in the spring, for corn, how deep shall I plow?

Mr. Smith.—It would all depend on how the land has previously been plowed and what the soil is. If land has always been plowed at a shallow depth it would not do to go down at a greater depth in a radical way; go down about an inch additionally each year until you get deep enough; but no man can come here and tell you just how deep to plow, nor exactly how to plant your potatoes, and a farmers' institute is not held for that purpose. Every man must work out those problems for himself.

Question.— Does the continued cropping with corn impoverish the soil for that particular crop?

Mr. Smith.— Most assuredly; why not? When you grow a crop of sixty bushels of corn per acre, you take out a little over twenty dollars in value in nitrogen, phosphoric acid and potash, all valuable plant food. It cannot be otherwise that when you grow corn after corn, unless fertility is restored, the fertility of the soil will be reduced.

Question.— Which is the best material for a silo, pine or hemlock?

Mr. Gould.— I don't know, but hemlock is just as good here as pine; but we use some southern yellow pine in Ohio. I have a silo that has been filled seventeen times, and it is just as good now as ever, while not a dollar's expense has ever been laid out on it for repairs. That is an old-fashioned square silo, built of native Ohio pine.

Question.— Would it be just as well to lath and plaster an old silo that needed relining, or would you advise one to board it instead?

Mr. Gould.— I would board it up every time; line it up with good boards.

Question.— With a thirty-six to forty foot carrier, which is the better, a " slat " or " blower " for elevating corn into the silo.

Mr. Gould.— Up to last year the carrier was ahead; but the general trend now is to use the "blower." It puts the silage into the silo at less cost, with less waste, and distributes it better than does the carrier. The finer the silage is cut the more may be put into the same sized silo, because it will pack closer and will better exclude the air. The cows will also eat it better and it will be easier digested.

Question.— How much is one ton of good silage worth, as compared with one ton of hay?

Mr. Gould.— Silage is worth one-third as much as mixed hay, not timothy.

CONCERNING CALVES.

Question.— How would you feed a calf for dairy purposes on skim milk from a separator, how much in quantity? What would you feed with it?

Mr. Van Dreser.— They should have new milk for the first three weeks; then put them on the skim milk, removing the cream gradually. In the place of these butter fats we give a tablespoonful of flaxseed jelly. Do not overfeed them, and feed at the same temperature each day; that is, do not feed it warm one day and cold the next. Keep the pail clean. We also feed a few oats or a little bran.

Question.— What is the best ration for calves three months old when there is not much milk to feed?

Mr. Van Wagenen.— I believe the best grains for the calf of this age or any growing animal to be oats, wheat middlings and oil meal. These foods are laxative, healthful, and contain an abundance of bone-making material. They should be fed at regular intervals. They should also have a little fresh clover hay each day and pure water. See that the pail and feeding trough are kept clean.

Question.— Would a calf raised on calf meal make as good a cow as one fed on sour milk? Would it not lack power to digest and assimilate bulky food?

Mr. Cook.— Any food that injures the digestion of the calf will lessen the value of it when a cow. No one food is as good as a combination of grains. Milk is almost an ideal food for the growing animal.

Question.— Can calves be fattened as well by feeding as when allowed to suck the cow?

Answer.— Not as well, though it can be done. Where calves are being raised on skim milk add a little oil meal and ground oats. These should never be fed in the milk, but in the pail after the calf has finished drinking. It becomes more thoroughly mixed with the gastric juices, and so much easier digested.

Question.— Which is the best, to feed a calf from the pail or from a calf feeder?

Mr. Van Dreser.— I prefer a pail. If the calf is well bred there will be no trouble in teaching him to drink. Care should be taken to keep the pail clean and sweet.

Question.— Would you take the calf from its mother as soon as born, or leave it for two or three days?

Mr. Witter.— I prefer to leave them with the cow for a little time.

Mr. Gregg.— Our practice is to take them away at once.

Question.— Will silage milk have a bad effect upon young calves?

Mr. Witter.— Not if the silage is properly grown, harvested and kept.

Question.— What element of food is required to prevent calves from nibbling their wooden feed boxes?

Mr. Van Alstyne.— Usually there is a lack of bone material in the food; they need mineral matter. Wheat middlings mixed in the milk supplies the lack in great part. When the calf drinks his milk from a bucket it does not excite the mammary glands as the nursing of the mother does. Later give the calf a few oats.

Question.— Will calves fat more rapidly if kept in the barn than when allowed to run out doors?

Mr. Smith.— The more closely confined one can keep an animal, if well and properly fed, the more rapidly it will put on flesh.

Question.— What is the best and cheapest grain ration to feed with separator skimmed milk to fatten veal calves?

Mr. Smith.— To fatten a veal that does not suckle the cow is not an easy job. The calf that drinks does not fatten as easily or quickly as does the one that nurses; but there are dairymen who succeed quite well with skim milk mixed with a little linseed meal jelly. There is a patent "nipple" which is put into the trough in which the calf takes the combination. I know one dairyman who claims forty-seven cents per hundred pounds for separator skim milk, fed in this way to calves. The cost of the nipple and fixtures is about two dollars.

Mr. Gould.— It is all right, but one must be thorough in keeping the nipple and bucket perfectly clean, which requires some time and labor.

Question.— Which will produce the best veal, to allow the calf to suckle the cow or to feed it new milk?

Mr. Smith.— To allow the calf to suckle. It is nature's way. The calf, when it takes its nourishment that way will not "bolt it" as it does when allowed to drink it. Digestion begins in the mouth, therefore nature's way of giving nourishment is the better way of the two.

Question.— When is it best to have calves come, spring or fall?

Mr. Bradfute.— We like our calves (since we use barns) to come in the middle of October and November and do not like them to come much earlier than that on account of the flies. I do not like a spring calf as well as a fall calf. If you have your calves come the first of October the mother can be outside when the little ones are yet small and can have plenty of exercise. The little fellows come at a nice season of the year, when there is no danger of frost bites, and when you have about six months of the winter time in which to care for the calves. Your calves are getting a good deal of their food from their mothers, so you are not giving them any of your expensive feed. You do not have to grain them very much for the first six months, but if you have your calves in the spring they are with their mothers during the summer time when your feed is the very cheapest possible, and just when weaning time comes she needs all the most expensive feed of your farm. You may have to feed the cow that raises the fall calf more, but it will be found that the spring calf costs more the first twelve months than does the fall calf. Now when we are expecting a little calf, if it is early in the fall the cow need not have any special food. I prefer her to be upon light pasture rather than upon the good pasture, especially the last month before the coming of her calf. You are not so much in danger of trouble after your calf is born, and especially is that true of milk fever.

Question.— What is the best winter care for calves?

Mr. Dawley.— On many farms it is a common experience that young stock do not much more than hold their own from fall till spring. What growth they get comes almost entirely from pasturing, and in too many cases this becomes appreciable only after they have entered upon their second summer. This is all wrong; calves should be kept growing during their first winter for several reasons. In the first place it is foolish and costly to throw away the feed for a whole winter, and get no return for it. Then it is unquestionably true that calves raised for the dairy are often dwarfed in their productive powers, and their future usefulness crippled by the lack of care and proper food for growth in their younger days. If it is profitable to raise calves at all it is most profitable to keep them growing thriftily from the day of their birth until they reach maturity. Here are three essentials to be kept in mind during the calf's first winter: First, it should have dry, clean, and warm quarters to feed and sleep in. Then it should be provided with an abundance of such food as will promote the growth of bone and muscle, and maintain sufficient animal heat to enable it to overcome the winter's cold. In order to aid it in accomplishing this it should not be required to drink large quantities of ice-cold water in cold weather; if it does a large portion of the food which would otherwise keep up its growth will be sacrificed in maintaining its vital heat. When calves are watered but once a day, and then with very cold water, the whole system receives such a shock that growth is out of the question. This must be realized by everyone who has seen the little things shivering over a trough of ice water from which their thirst has compelled them to drink greedily. Pens are far better for calves during their first winter than stanchions; they may be kept warmer in this way, can have a better bed to sleep on, are more easily kept clean, and they will grow better if given a chance to freely move about without restraint. Fine hay, of which a part should, if possible, be clover or alfalfa, with a little wheat bran or middlings and oil meal, and one feed each day of sliced mangels, will keep the calves in good condition and keep them growing. If warmly housed they will require no fattening foods, such as corn meal, but should be liberally supplied with the elements that give growth. It pays to keep the young things growing, for when growth ceases not only is there no interest accruing upon your investment, but the time spent in caring for them as well as the cost of their food is practically lost.

HORSES.

Question.— How can I tell whether a farm horse is sound when I want to buy?

Mr. Dawley.— You can't always tell, but you can study how best to examine him. Go at it like this, systematically: See the prospective purchase in the barn before he is exercised. Watch him at rest. Note if there is abdominal breathing, the symptom of "heaves." See that he is not a "cribber" or "windsucker." Watch him backed out of his stall. Then, if at all, he will show signs of "crampiness" (chorea and often a spavin). Let him stand for a minute of two while he is being looked over; if he is lame in front the sore foot will soon be stuck out in front of the body; if he is lame or sore behind, the feet will be shifted one after another. Stand in front of him; note the shape of his head, his ears, his eyes, his nostrils. He should have a wide brow, alert, thin ears, clear, prominent eyes and well-spread nostrils. Test his eyes for soundness by pretending to strike them, which will make him flinch unless blind. Examine the teeth, nostrils for discharge, under jaws for abscesses, bones of jaw for enlargements indicating big head, jugular veins for evidences of previous bleeding or obliteration of the vein, and the ears for abscess or other troubles. Then pass to the side of the horse and study his conformation as regards the top lines. Examine mane and see that there are no chronic sores beneath it, then along neck after feeling back of ears for "poll evil," until the withers are come to and searched for "fistula." Turn around and face the horse. Examine shoulders very carefully to see how collar will fit, that there is no chronic sore at top of neck or at point or side of shoulder or deep-seated fibroid tumor in muscles to the front of the shoulder. Next examine elbow for "shoe boil," and run the hands down the legs looking for broken knees, splints, high or low, "bowed" or thickened tendons, interfering sores upon inside of ankle joint, around coronet for ringbone, laterally for "side bones" (ossification of the lateral cartilages), the hoof for quarter crack, or abnormal rings indicating disease, as founder. Now pick up the foot, flex the tendons, look again for side bones, examine for corns, dry, blood-shot or suppurating; for "thrush," indicated by foul-smelling discharge from cleft of frog; for dropped sole, indicating chronic, incurable founder, and take into consideration the general condition and shape of the foot, indicating value for work. Quittor, tread, stone bruise, nail prick, seedy toe and other troubles are discovered or found absent in the same examination. We then pass to the barrel of the horse, looking for broken ribs, for sores under saddle, on belly, etc., for weak back, for flat ribs, for pregnancy, for general evidences of thrift. The scrotum or udder should next be examined for abnormalities, then the hind extremities for unsoundness, or the reverse. The tail must be looked to; it may be weak, crooked, diseased; next the anus, which is sometimes paralyzed, and which should always be firm and pursed up; the vulva of mares which may have been torn in foaling, or show discharges indicating abortion or leucorrhœa. Next examine hind leg in same way as fore leg for bone spavin, low down on inside aspect of hock joint, bog spavin about the same place, thoroughpin, capped hock, curb, crooked joint, sprung hock, splints which are sometimes found upon hind leg. Lower down make careful examination for grease heel, scratches, sores, interfering marks, and lower for ringbones, quittor, sand crack or any abnormality. Pick up the foot and examine it as done with the fore foot, then pass around to the other side and make a similar examination of every part of the body from that aspect. When all of this has been done the horse may be harnessed and fully tested for soundness of wind by hitching to a wagon and giving a stiff gallop in soft ground or after locking the wheels. He should not sob, roar, whistle or wheeze. Legs should be properly flexed and there should be no signs of lameness.

Question.— What is the value of carrots for horses compared with oats and corn?

Mr. Van Alstyne.— It is difficult to make a comparison. The carrots contain a large percentage of water and their succulence gives them an additional value. This is particularly the case when you have no silage to feed.

Question.— How many times a day would you clean a horse?

Dr. Smead.— As often as he needs cleaning. If standing in the stable one thorough cleaning a day will be enough; if it was driven from Ensenore this morning with me it will need another.

Question.— Is coarse wheat bran and ear corn, about half and half by weight, a good ration for horses in cold weather, with plenty of good hay?

Mr. Cook.— It depends upon the work being done; for hard work nothing is better than corn and oats, with the addition of a little bran. I prefer feeding corn in the ear; if it gets very hard soak it over night. The young colt should not have the corn.

Question.— Would you advise a bar shoe for a corn of long standing?

Mr. Brodhead.— It is hard to answer definitely without seeing the subject; I use a bar shoe; I pare the corn carefully and make the shoe slightly convex; the shoe should be frequently reset.

Question.—Are oats and bran a good mixture to feed horses, mixed half and half by weight?

Dr. Smead.— Every man should know that oats are the best food he can feed a horse. They contain one part of protein or muscle, nerve and blood food, while they have six parts carbohydrates or heat producer. If worked on the road every day oats alone would be the best, with a little mixed hay. It would not be wise to give him bran; but if you have an idle day give him a bran mash. If you are feeding straw more bran should be given.

Question.— Does it pay to mix corn with oats for grinding for horses?

Dr. Smead.— There is nothing gained by mixing corn with the oats; you do not get value received for the corn when the horse is working, as the corn does not contain the muscle-forming food element. I want to repeat what I have said many times before, that if you have to feed straw, timothy hay or cornstalks, you can not balance the ration with corn meal and keep the horse in health. Sooner or later you must give some of the foods that are rich in protein, as the wheat bran.

SOME FACTS ABOUT PIGS.

Question.— What is the best breed of hogs to raise?

Mr. Van Wagenen.— I do not believe that we can say that any one breed is superior to all others. In general the best hog is the one that will put on the most pounds of meat in the shortest time and with the least expense.

Question.— What grain should be fed to pigs that have a clover pasture?

Mr. Cook.— Some food of a fattening nature, such as corn. He also spoke of the value of rape as a feed for either pigs or sheep; sow only the Dwarf Essex variety.

Question.— Which is best for hogs, sweet milk from the separator or sour?

Mr. Van Wagenen.— I do not understand that the feeding value of milk is lessened by the first stages of souring, but I can see nothing to be gained by souring it; if allowed to reach the latter stages it is unquestionably bad. I believe as a rule that better results will be had with any animal if its food is of a uniform quality.

Question.— Are oats good for growing pigs?

Mr. Cook.— Certainly; they are one of the best foods for any growing animal. For the young animal they may be fed whole, but for the older it will be better to grind them.

Question.— What is the feeding value of cabbage and molasses for pigs?

Mr. Van Alstyne.— Cabbage has about the same feeding value as silage, and I consider it better for hogs. The refuse molasses from the sugar factories is being fed to some extent with good results, but I have never used it.

Question.— Is oil meal good food for fattening pigs fed with corn meal and milk?

Answer.— It is not as good for pigs as for other animals, and should be fed sparingly. No food can take the place of oats for the growing animal.

Question.— What do you consider a balanced ration for young pigs?

Mr. Cook.— For the first six weeks of the pig's life I would prefer a narrow ration, at least one to five; for the next two months it should be a little wider, perhaps one to six, and after this one to seven. This keeps the animal growing nicely and adds a little more fat as it grows older. Charcoal is also valuable; it should be kept before the pigs constantly. If charcoal cannot readily be had a mixture of salt and ashes may be substituted.

Question.— Would you sow rape for pasturing hogs?

Mr. Cook.— Rape is a valuable food for many animals, particularly sheep and hogs. If fed to cows great care must be taken or it will taint the milk. I believe it better to sow it so that it can be cultivated, as I have noticed that the animals prefer this to that which is sown broadcast. Any quickly growing vegetable has a better flavor, and rape is no exception to the rule.

Mr. Wing.— Dwarf Essex rape is a good food for pigs. Sow four pounds of seed among the corn rows at the last cultivation. It will begin growing before the corn is off and will grow at a low temperature; it requires a temperature within twelve degrees of zero to stop its growth. Feed it to sheep, pigs or cattle, but do not feed it to milch cows till after they have been milked.

Mr. Woodward.— You can make pork for three cents a pound with it, but you should feed some grain with it. One acre will pasture twenty hogs; sow Dwarf Essex rape.

Question.— Which is the most profitable to feed to pigs, middlings, red dog flour or bran?

Mr. Witter.— Sweet skimmed milk and bran for the young pigs just weaned; later feed the middlings. Get the pig ready for market as soon as possible. The market does not want "pork" now, but pigs weighing, dressed, from 100 to 150 pounds.

Question.— Would you advise a cement floor for a hog house?

Mr. Gould.— I am not "up" in "hogology," so can give no experience, but I have heard Mr. Louis of Wisconsin, the best known hog authority, say that he would never put a hog on a stone or cement floor. It is too hard and cold for them.

Mr. Van Wagenen.— We raise some pigs, but they are all kept on board floors; but the life of a plank floor in a pig pen is not more than three or four years, so must be renewed. The pig ought to have a dry, clean floor, and it should be water tight, a good deep, dry bed being supplied for the pigs. Some farmers lay a cement floor, then place a wooden one over it; the cement prevents any of the liquids from going through the floor, and makes the sanitary conditions better.

Question.—At the present prices for grain, is there more profit in selling pigs four weeks old at $2.50 each, or in feeding them and selling them when six months old at five cents per pound, live weight?

Mr. Wing.— It would depend. If one had a plenty of nice, warm separator milk and some wheat middlings, and would sell the pigs when they would dress not above 125 to 150 pounds I think there would not be much difference; ordinarily, most profit would come from selling the pigs at $2.50 each.

Question.— Is gluten a good feed for growing pigs?

Mr. Smith.— No; because it lacks in mineral element. Probably with skim milk, wheat middlings are the best for growing pigs.

Question.— What is the Tamworth breed of swine? Is there any difference between them and the Southern Razorbacks?

Mr. Dawley.— The Tamworth is not like the Southern Razorback, excepting in its vitality and prepotency. It is one of the strongest breeds of swine in existence, and is just as much a pure blood as the Yorkshire or Berkshire; there is no breed that will impress itself upon the progeny as strongly. It had its origin in Tamworth, England, a place noted for its production of first class bacon for a century. It is a bright cherry red, varying from light to dark, has a rather long nose, light jowl, erect ears, long legs, strong feet, narrow and smooth shoulders, sides long and deep, back not very wide but flat, bearing a heavy loin. All animals of this breed are great rustlers, active, wide-awake, rapid growers, maturing early, and at maturity the largest breed of swine. A visit to the show yards and farms in Canada, where the Tamworths are quite popular as an export hog and, perhaps, the most profitable breed that is being grown by Canadians, will convince one of this fact. The Duke of Fairfield, that stood at the head of Mr. Wood's herd, weighed 1,016 pounds in breeding flesh. Amber Luther, who was twice a winner at Toronto, weighed over 1,100 pounds just as used in the herd, and carrying this immense weight stood up squarely on his feet and walked as nimbly as a horse. Juliet III weighed 860 pounds in September, and in October farrowed and saved eleven pigs. While the bacon market demands a hog weighing about 200 pounds, Tamworth breeders have aimed to increase or maintain the massive size and length of bone of their breed, as this quality will make the breed always useful in America to add size to the breeds which are largely scattered over the country and which are called by some the lard breeds. The Tamworths are very prolific; this shows in the grades and makes them of special value in crossing on the swine which are now found on most of our farms, and which do not produce litters that are large enough or pigs that are strong enough to make the greatest possible profit. The grade pigs make very rapid growth, and any breeder, who wishes to experiment with this, can for himself note the great difference in their growth as compared with thoroughbred pigs of any of the English breeds.

SHEEP.

Question.— Would you advise a farmer to keep sheep in connection with his dairy cows?

Mr. Van Wagenen.— Our farm has not been without sheep for several generations. We consider them profitable; they eat many varieties of coarse stuff a cow will not touch. I would keep a few sheep, but it is another question whether they ought to run with the cows constantly or not.

Question.— How many sheep should be kept in the dairy pasture?

Mr. Van Alstyne.— None at all. Keep them in a separate pasture. The sheep will do well enough with the cows, but the cows do not like them. Sheep are valuable to keep out weeds; turn them into the pasture after the cows have been turned into a different one. Kept in this way there is no doubt but a few sheep may be profitably kept on a dairy farm.

Question.— Will rape sown early in the spring make a good sheep pasture throughout the summer?

Answer.— It will. It should be sown the latter part of April; when it has grown to some extent the sheep may be turned upon it, and as they pasture it off it will grow again and furnish excellent food throughout the summer.

Question.— What would you do for a sheep's udder that gets hard after the lamb has been dropped?

Dr. Smead.— It is difficult to treat, as the usual remedies for this gargetty condition are such that the lamb will not suck. I know of nothing better than thorough applications of warm water and a little well salted butter worked in with the hands. Vaseline is good, but is offensive to the lamb.

Question.— Do you think that corn will hurt hot-house lambs?

Mr. Slocum.— I would feed some corn with other grain.

Question.— What is the best grain ration for hot-house lambs?

Mr. Wing.— We feed equal parts by weight of cracked corn and wheat bran, with ten per cent. of oil meal added. Give them all they will eat three times a day.

Question.— What is the best food for fattening lambs for market?

Mr. Wing.— For the winter lamb, an abundance of mother's milk from birth. At two weeks old accustom them gradually to grain. To do this it is necessary to have a place where they can be fed by themselves. Our feed is equal parts of cracked corn and wheat bran, to which ten per cent. of oil meal is added. Feed them all they will eat, three times a day, cleaning out the trough daily. In addition we give them all the ear corn they want. Our yearling lambs get alfalfa and ear corn only.

Question.— What is the best breed of sheep to produce winter lambs?

Mr. Woodward.— Merino dams and Dorset males, by all odds.

Mr. Stanton.— I understand that Mr. Woodward raises hot-house lambs. I would like it if he will tell us something about them, and at what age they are marketed.

Mr. Woodward.— We raise winter lambs — not hot-house — every year. When I left home a few weeks since we had 600; there are now probably 700. The sheep are all kept in warm, comfortable barns, and the lambs dropped early enough to be profitably marketed, which is at a weight of twenty-five or thirty pounds each. To successfully raise such lambs the ewes must be properly housed and fed, and the lambs carefully looked after as soon as they are dropped. Some silage and turnips, with a little clover-hay and wheat bran make the best ration.

Question.— How do sheep benefit pastures?

Professor Shaw.— That the sheep has a golden hoof has long ago passed into a proverb. The proverb doubtless is rooted in the idea that lands on which sheep graze improve rather than deteriorate in fertility. When the question comes up, "How shall the abandoned farms of New England and the maritime provinces of Canada be renovated?" the answer usually given is, "turn them into sheep pastures or stock them with sheep."

How, it may be asked, can sheep enrich lands, since the flesh and wool sold come from the fertility in the land? If these come from the fertility of the land, and if in the sheep and wool sold a certain percentage of these elements is sold, howsoever small it may be, does it not follow that in the absence of renovation from outside sources the elements of fertility in the soil would continually wane rather than increase? Theoretically, this view at first thought would seem to be correct, and yet the fact remains that where sheep graze the pastures themselves not only improve, but better crops can be grown on the land when it is broken up. How can this be?

It may be explained as follows: The grasses draw food elements from the subsoil as well as from the surface soil. The growth resulting from these is consumed by the sheep. It is deposited again on the land in the droppings, hence the available fertility for producing grass continually increases. Theoretically the plant food in the subsoil decreases, but as fast as it does, through the action of various agencies, inert plant food in the subsoil is transformed into available forms. Theoretically the amount of this inert plant food decreases, but usually there is so much of it in the subsoil that the transforming process will continue as long as decay continues in the subsoil, which is practically forever. The surface soil, therefore, continually improves when it is being pastured by sheep, and with such improvement the growth and decay of grass roots near the surface also increases, hence the supply of humus in such soils increases all the while. Why then do not these results follow from the grazing of cattle? For the reason, chiefly, that the droppings of cattle are deposited in a way that results in much waste of the same from various causes, while the droppings of sheep are so deposited that there is but little waste.

But there is yet another source from which enrichment comes, in some pastures at least, when legumes grow in these, as clovers, for instance, they further improve the land by the enrichment which they bring to it in the form of nitrogen taken from the air. In permanent pastures in which white clover grows this process goes on more or less every year, and the influence which it exerts on soil improvement is doubtless considerable. Japan clover will exert a similar influence on grazing in the South. The growth of these should, therefore, be encouraged by sowing the seeds in soil in which they may not be growing.

The available fertility in sheep pastures, therefore, should continually increase under ordinary conditions of grazing. But such increase may be greatly facilitated, and by the simple process of adding certain meal or grain products to the food of the sheep while they are being grazed. This, of course, must be judiciously done, or the full benefit possible may not be realized. For instance such food may be fed when they are not greatly needed by the sheep. But there are times and ways in which they may be so fed almost every year during some portion of it. When lambs are weaned such foods may be added with much advantage, and the same is true of lambs or older sheep that are to be finished for the market on such pastures. The larger the proportions of oil cake and wheat bran fed in such foods the more proportionately will the fertility of such lands be increased.

But little experimenting has been done with a view to obtain information as to the influence of such foods on grazing, or as to the profit from feeding them. But when these foods are so fed by way of supplementing pastures, no statements regarding the results from feeding them will be at all complete which do not consider the influence which they exert on the pastures. The renovation of worn lands could be greatly hastened by such a process. And here it may be added that when these foods are fed judiciously it should be possible to get the full value of the foods thus fed in wool and mutton.

But sheep benefit pastures in other ways. Supposing the pastures are growing weeds or brush to a considerable extent, grazing these with sheep will check such growth, and in the end it will completely remove it, with, in some instances, a little aid from man. There are but few weeds which sheep will not eat when they are young; but there are some. These are burdock, mullein and some others. To completely get rid of these it may be necessary to mow them or destroy them otherwise, but with the exceptions referred to the pastures will soon be made clear. This means that the elements that were partly used in growing weeds will thenceforth be devoted to growing grasses.

POULTRY.

Question.— What is the best way to ventilate a hen house, twelve by twenty-four, and with six-foot posts?

Mr. Van Dreser.— I would ventilate by the windows. Open them a little during the middle of the day, taking care to close them early. I prefer a one slope roof with nine and a half foot posts in the front and six foot in the back. We have a board roof, covered first with two-ply felt and then with steel roofing. There should be two windows in a house of this size, and they should open toward the east or south. It will accommodate sixty hens.

Question.— Will hens pay better than cows?

Mr. Cook.— I believe that for the time, labor and capital invested, the hens will pay the best. We have always followed dairy farming, but we shall increase our poultry flock. Last year they netted us over a dollar each.

Question.— How does Mr. Van Dreser make his cement floors?

Answer.— We first level the ground and provide drainage; then place a layer of small stones; cover this with a coating in the proportion of one part of Portland cement to four parts of sharp sand. This should be two inches thick for the cow stable. For the hen-house one part to six will be strong enough, and a coating an inch thick will be sufficient. Great care should be taken to have the sand clean and sharp, and to mix it thoroughly. We mix twice before adding the water and once afterward. Do not get the mixture too wet, and leave the surface slightly roughened.

Question.— Should there be an alley in the hen-house, and where should it be placed?

Mr. Van Dreser.— I would not have one; it is needless and a waste of room. Our house is nine feet high in the front and six feet in the back. It has a southern exposure which allows the light to strike into the back part of the building. The building should be double boarded and the space stuffed with hay. This insures warmth and freedom from dampness. The pens in the building are fifteen feet square and have doors opening from one pen to the other; these doors swing both ways so that there is no difficulty in passing from one pen to another. I prefer a cement floor; it is more durable and is rat proof.

Question.— What is the best make of incubator?

Mr. Van Dreser.— We use both the Prairie State and the Cyphers, and are well pleased with them, but any standard make will give satisfaction.

Question.— What is the cause of the blood clot sometimes seen in eggs?

Mr. Van Dreser.— I have been told by experts that it is due to a hen having received a jar when jumping from a high place, thus prematurely forcing an embryo egg from the ovary.

Question.— What percentage of eggs should be fertile with a flock of twelve hens in warm spring weather?

Mr. McGrew.— The records from all over the United States show that about twenty-five per cent. of the eggs fail to hatch, although theoretically all should be fertile. A greater fertility will be had where the hens have a free range than when confined.

Question.— What value have the egg foods that are so extensively advertised?

Mr. Van Dreser.— We cannot afford to buy them. If the hen is well she needs no medicine; if she does need it buy it elsewhere at its proper price.

Question.— How will it do to feed the hens corn on the ear instead of shelling it for them?

Mr. McGrew.— They will be apt to be fed too much; it had better be both shelled and cracked. Not over one-fifth of the grain ration should be corn, as it is very fattening.

Question.— Is there much danger of overfeeding White Leghorns?

Mr. Van Dreser.— I do not think so. These birds are very nervous and energetic, and do not put on flesh as readily as some of the other breeds.

Question.— If hens have not had access to salt, would it be safe to give them all they will eat at first?

Mr. McGrew.— Salt is not absolutely necessary for fowls, and if they have never had it care should be taken. Put in no more than you would in your own food.

Question.— Is fifty cents too much to pay for Leghorn hens six months old?

Mr. Rice.— If you have a place to keep them it is a very low price. If pure bred they are worth much more, as the eggs will sell at a high price for setting. The Leghorn should begin to lay at from five to six months of age.

Question.— Which is the best, the Brown or the White Leghorn?

Mr. Rice.— There is little difference so far as the number of eggs is concerned. There is more difference in various strains of the same breed than between the breeds themselves.

Question.— What is the reason that hens will not lay if they are well fed and have a warm place to stay?

Mr. Van Dreser.— It is entirely a matter of breeding. If the hens are properly selected from the laying type and are properly cared for they must lay.

Question.— What shall we use to destroy the mites on our poultry?

Mr. Brodhead.— Whitewash the building thoroughly, applying it with a spray pump if you have one. In addition to this the perches should have a thorough application of kerosene emulsion.

Question.— What do you do with hens that are too fat to lay?

Mr. Rice.— Change the ration; leave out the corn and other fattening foods and feed oats and peas, wheat bran and clover hay. Give them no ground feed, but make them work for all they have.

Question.— Where can I obtain oats that are free from hulls to feed poultry?

Answer.— Probably from some of the Buffalo feed dealers. Many of our best poultrymen feed them with the hulls with good results.

Question.— What is your opinion of the Spangled Hamburgs for layers in this section?

Mr. Van Dreser.— They are great layers, but the eggs are small, and I believe that we should strive for an egg of good size. The product will also sell better if it is large and uniform.

Question.— How shall we care for our hens that we may have eggs in winter?

Mr. Rice.— The first essential is proper food; but no skill in feeding can secure the egg production in the months of October, November and December that will naturally come in the late winter and spring. Those who can produce winter eggs can almost make their own price. And the hens will lay just about as many eggs the next summer as those that did not lay during the winter. The secret of winter eggs is a comfortable house, proper food and congenial surroundings. A variety of food can be fed with less cost and much better results than any one food exclusively. Our practice is to feed a little whole grain in the morning, scattered in the litter where they must work for it. At noon they have a feed of a mixture of wheat bran, wheat middlings, ground oats, corn meal and animal meal, in equal parts by weight. This is mixed with boiled vegetables. Cabbage or beets will furnish them a succulent food. They should also have plenty of pure water and grit in some form. The house should be of matched lumber, ceiled on the inside of the studding and the space stuffed with straw.

Question.— Do you favor cross breeding in poultry?

Mr. Van Dreser.— I do not. More certain results will follow the use of thoroughbreds exclusively. The weaknesses of the parent birds are more likely to be transmitted than the good qualities.

Question.— What do you consider a balanced ration for poultry?

Mr. Van Dreser.— For a laying hen of the Leghorn or other Mediterranean breeds it should be one of protein to six of carbohydrates. If of the Plymouth Rock type, I would feed a narrower ration, as these breeds are more likely to lay on fat.

Question.— How about the clover meal that is now in the market for poultry?

Mr. Van Dreser.— It is all right, but I prefer the cut clover hay, as it is much cheaper. I am now using alfalfa in preference to the common clover.

Question.— What is the cause of hens eating their eggs?

Mr. Rice.— Probably owing to a lack of mineral matter in their food, although if the habit is acquired the supplying of such mineral elements may not prevent it.

Question.— Is there any difference in the quality of the eggs of the different breeds?

Mr. Van Dreser.— I do not think there is much, if they are fed equally well, but the quality of the food affects the eggs to a marked degree.

Question.— What kind of incubator would you recommend, and what size for a hundred-hen flock?

Mr. Rice.— We have used the Cyphers with good results. I should use the 200-egg size, as the expense is almost the same as with the smaller sizes.

Question.— Would you recommend White or Brown Leghorns as egg producers?

Mr. Van Alstyne.— There is more difference in the strains than in breeds. The White Leghorn is a little better market bird.

Question.— What is best to feed hens in winter? Do they need water if they have all the skim milk they want?

Mr. Witter.— Skim milk is excellent, but they should have water also. The ration which Mr. Rice feeds is as follows: 100 pounds corn meal, 100 pounds wheat bran, 100 pounds wheat middlings, 100 pounds ground oats, 100 pounds animal meal. The morning feed is a moderate amount of whole grain scattered in the litter. This keeps them busy till noon when they are fed all they will eat of the above mixture, which should be slightly moistened. At night they have a ration of whole grain. This, with an abundance of oyster shells and pure water, furnishes all the materials needed for egg production.

Question.— What are the comparative merits of the Leghorns and Wyandottes?

Mr. Van Dreser.— I am unable to say, as my experience has been almost exclusively with Leghorns. The Leghorns or some of the other Mediterranean breeds are no doubt better for egg production.

Question.— Is there any injury to poultry from feeding condition powders?

Mr. Rice.— No; it is simply a question of expense. I believe if fowls are properly fed there is no need of any such preparation.

Question.— What breed of hens are the best layers?

Mr. Rice.— Leghorns, Minorcas and other breeds of the Mediterranean class. These are all good layers if properly fed and cared for, but are not good mothers. For a general purpose fowl the Plymouth Rocks or Wyandottes are preferable.

Question.—How warm should a hen-house be kept in the coldest weather?

Mr. Rice.— Hens will thrive and lay well in quite a low temperature if they are not allowed to freeze their combs. They will do well at forty degrees if the house is kept dry.

Question.— What is the best breed of hens to raise for egg production?

A Farmer.— The Black Minorca is best.

Another Farmer.— I prefer the Buff Leghorn.

Mr. Smith.— There are a number of good egg producing breeds, provided they are well housed and properly fed. One of the best is the Single Comb White Leghorn. But all in all for the average farmer I think that the Barred Plymouth Rock is the best breed. It would depend very largely on the likes and dislikes of the owner, however, and the care he gave his hens.

Mr. Rice.— If one is keeping hens solely for eggs, and has one hundred or more, if he will provide proper sanitary conditions and feed them as they ought to be fed, some of those termed the Mediterranean breeds are the best. Ours are the Single Comb White Leghorn. If, however, the average farmer's wife (and she is the one who always looks after the hens) wants a flock of from twenty-five to fifty no doubt but some of the American breeds are the best. If I were to recommend one for the farm it would be the Barred Plymouth Rock. It is a remarkably strong fowl, a fairly good layer, an excellent mother, and one of the best table fowls, in short, it is the best all round, general purpose hen I know.

Question.— How much ground meat should be fed to a laying hen daily?

Mr. Smith.— I am not positive, but I think not more than one ounce per day.

Question.— Will finely cut, second growth clover answer the purpose of other foods for egg production?

Mr. Smith.— From what I have heard poultrymen say, I am led to believe that such early cut clover will not take the place of the concentrated foods. But both the clover and the bone meals, grains, etc., should be fed.

Question.— What will prevent scales on the legs of chickens or hens?

Mr. Rice.— It is a small mite that works under the skin that forms the scale. Kerosene and lard, made as thick as salve, will soften the scale. Wash the legs carefully with strong soapsuds, and occasionally with kerosene oil. In a few days the legs will become clean and free of the scale.

Question.— What causes lameness in full-grown poultry? Give the remedy.

Mr. Rice.— There are two or three causes. One of them is rheumatism; it is caused by moisture. Take the fowl out of the house, put it in a warm, dry place and give it about as much salsite of soda as you can hold on the point of a knife. Sometimes such lameness is caused by the egg being turned, so that it does not pass readily. I have seen hens "faint away" when such was the case. A little sweet oil properly administered to the part will, as a rule, assist the hen to pass the egg. Sometimes placing her on snow will do it.

Question.— What should we do for lice on hens?

Mr. Smith.— There is a good deal to do. If a man keeps hens in the old way, surrounded with and allowed to "roost" on old boxes and barrels, it will be a hard job to get rid of the mites. The "roost" or perches should be kept clean and sprayed with kerosene oil and carbolic acid; this kills the mites.

Question.— One pound of "red albumen," powdered, one pound of black pepper, given in two teaspoonfuls to each flock of twelve hens, mixed with feed, daily. Is it a hoax?

Mr. Van Dreser.— If there is any such thing as "red albumen" I would like to see it. The man who wrote that question either did it as a joke, or else he has read some humbug advertisement in a "Cheap John" paper. "Red albumen" is a hoax of the first water.

VETERINARY.

Question.— My heifer has a hole in the side of her teat through which the milk comes while milking. How can it be stopped?

Mr. Witter.— It is a difficult thing to treat.

Mr. Cook.— It can be done when the animal is dry by cutting slightly across the opening and allowing it to heal.

Question.— I have a cow whose bag commenced to cake the day before she calved, and it is still caked. What would you advise before and after calving?

Mr. Cook.— Usually the application of hot water with a little saltpeter will relieve it; for severe cases use antithermaline. It is always well to give a cow from one-half to three-fourths of a pound of epsom salts a week or two before calving.

Question.— What will take the warts off cows' teats?

Mr. Rice.— I would advise rubbing well with carbolated vaseline. This remedy is also useful in case of slight wounds, etc. Every farmer should have it in his stable.

Question.— Where do cattle lice summer, and how can they be exterminated "for keeps?"

Mr. Cook.— They are ever present, and constant watchfulness is necessary. Keep the stable whitewashed as a preventative; keep the animals cleaned. We have used soapsuds to which a tablespoonful of carbolic acid to the gallon has been added; apply with a cloth and clean the animal thoroughly.

Question.— What is the cause and the cure for "milk fever?"

Dr. Smead.— This condition has been improperly termed fever, and also apoplexy. It comes on soon after calving, its symptoms being dizziness and trembling, soon followed by unconsciousness. It was studied for a long time, many theories were advanced and different treatments tried, but four out of five would die in spite of all that was done. A Dane named Schmidt was the first to discover the cause. He noticed that it was the best cows, the persistent milkers that were affected, and also that these cows were never perfectly dry, but there was a slight secretion of milk that accumulated in the udder that became affected in some way by a disease germ. Just before calving this poisonous matter is absorbed into the system and causes the condition mentioned. A German investigator by the name of Schmitt continued the investigations with the view of discovering a remedy which he finally found in the iodide of potash. This will neutralize the poison. One-half ounce of this dissolved in a pint of boiling water and injected into the udder will nearly always be effective. The instrument used is a four-ounce rubber syringe, a small milking tube and a short piece of rubber tubing. Fill the syringe and inject into each teat, having the mixture as warm as you can bear your hand in. In an hour or two the cow will usually show a marked improvement. Since this treatment was introduced a large proportion of the cases treated have recovered. As soon as the animal becomes conscious give her a gill of whiskey or a pint of ginger tea to stimulate the action of the heart, which this treatment and the disease has tended to depress.

Question.— Will Dr. Smead tell us the cause and cure of the stomach worms in sheep?

Answer.— This is something that causes great loss to the sheep breeders. The eggs, or the embryo worms, after leaving the sheep are to be found on the pasture grasses and are often taken from there to the stomach of the lamb. The best direct remedy is gasoline, but care must be taken in giving it. Mix one tablespoonful of gasoline, two of pure, raw linseed oil and four of sweet milk; handle the sheep carefully; set her on her haunches, insert the bottle containing the mixture in the corner of the mouth and she will take it readily. Give it in the morning before the sheep has been fed. Three doses are usually sufficient.

Question.— What is the cure for the disease in sheep known as the stretches?

Mr. Rice.— The disease is caused by indigestion and constipation. It may be remedied by feeding more of the protein foods, such as bran, clover hay and foods of that nature. Roots or some succulent food are also beneficial.

Question.— What is it best to do for a horse that has the heaves?

Mr. Witter.—An established case of heaves cannot be cured, but may be relieved by feeding moist, concentrated food.

Question.— What remedy would you recommend on hardened proud flesh on flesh wound?

Dr. Smead.— If it has become hardened it can only be removed by the knife. When it first appears it can be kept back by several preparations, but I know of nothing more powerful or safer than the butter of antimony. Wet the injured part with it, applying with a feather; remove the scab that forms and apply again and continue till it is entirely reduced.

Question.— Should good, bright, clover hay be fed to a horse, or will it cause the heaves?

Dr. Smead.— Certainly it should be fed, but fed properly. Give no more of any hay than the horse will eat up clean in an hour.

Mr. Witter.— If fed in limited quantities with grain there should be no trouble. If the animal is predisposed to heaves it will be well to cut the hay, wet it and mix with it the grain ration.

Question.— What would you give a horse for a hacking cough?

Dr. Smead.— Give a mixture of one-half pound of chlorate of potash, two ounces of cubebs and one pound of granulated sugar. The dose is a tablespoonful given in the feed.

Question.— How can we cure worms in the horse?

Answer.— For most of the several varieties of worms to which horses are subject, and particularly the pinworms, there is nothing better than a substance found in the eye of the potato. Let the parings accumulate till you have enough for four or five doses; cut enough to fill a four-quart measure into small pieces and mix with four quarts of wheat bran. Give them when the stomach is empty in the morning and wait two hours before giving any other food. Do this for three mornings, and if no results are observed repeat for two mornings. If the worms are not coming away freely give three-quarters of an ounce of aloes.

Question.— Is there any cure for the string halt?

Mr. Witter.— Our highest authorities state that this is a nervous trouble, which becomes a habit, and that there is practically no cure.

Question.— How should a colt be broken, and how should its hoofs be cared for?

Mr. Brodhead.— I do not believe in "breaking" colts as it is termed. I prefer educating them, and would begin when but a few days old. Accustom them to the use of the halter and to having the feet handled. The colt's foot should be carefully watched and be kept pared level, otherwise it is apt to break off on one side, throwing the foot out of balance. At three years of age and earlier in some cases they should be shod; always use plate shoes, as light as possible; use small nails, driven low down and never clinched; level both shoe and foot as accurately as possible, and never burn a hoof as so many do, as this practice causes many hoof diseases; never use animal or vegetable oils as a dressing for the foot; there is nothing better than veterinary petroleum, which is one of the cruder forms of vaseline; for inside use the White Rock Hoof Packing, to which water should be added until it is the consistency of jelly; it will take up many times its weight in water, and when applied to the hoof will soften it and relieve the inflammation; it should be renewed every day.

Question.— What are the symptoms of hog cholera, and what is the remedy?

Dr. Smead.— This disease probably will never prevail here, as it does in the West. The surroundings and methods of feeding there are more favorable to its development, and the freer range which the swine are allowed tend to spread the infection. The symptoms vary. There is usually a stiffness, lack of appetite, the skin under the throat becomes of a reddish or purple color and there is frequently a cough. No cure is known. The treatment given is to prevent its spread. To do this remove and quarantine the infected animals at once; wash them with a one per cent. solution of chloronaphtholeum and spray the pen with the same; give internally three drops of carbolic acid, diluted with 100 parts of water.

Question.— How may we rid our cows of lice?

Mr. Van Dreser.— Our plan has been to apply some of the carbolic sheep dips, after being diluted, to the back of the animal, using an oil can for the purpose, then work it thoroughly into the hair with a curry-comb. We have found two such applications very effective.

Mr. Witter spoke of feeding a little oil as a preventive; this gives the animal an oily coat, which tends to keep off the lice.

Question.— What is a remedy for foot rot in sheep?

Dr. Smead.— Examine all the sheep and thoroughly clean the hoofs of any foreign matter; dissolve one-half pound of blue vitriol in a gallon of boiling water, put the sheep's feet into a pail containing this mixture and keep them there for ten minutes. This treatment will probably kill all the disease germs.

Question.— What should be done for a two-year-old heifer due to calve April tenth, whose udder is swollen, caked and inflamed?

Mr. Witter.—Avoid feeding an excess of heating foods. If the tendency increases, milk her daily, washing the udder with warm water. I would also recommend the following: Copperas, two ounces; gentian, two ounces; saltpeter, 4 ounces; cream of tartar, four ounces; nux vomica, one-half ounce; pulverize and mix, feeding a tablespoonful three times a day with the grain.

Question.— What is the best simple remedy for colic in horses?

Dr. Smead.— If it is of frequent occurrence look for the cause and remove it if possible. A simple remedy is equal parts of laudanum, ether, tincture of ginger and spirits of nitre. Give two tablespoonfuls in a little water every half hour until the animal is relieved.

Question.— What will kill ticks on sheep?

Dr. Smead.— I prefer some of the carbolic sheep dips. They are cheap and not injurious. If the lambs and sheep are dipped at shearing time and again two weeks later, all ticks will be killed. If they are troubled with them in the winter, turn the sheep on her back, and, with an old teapot, pour about a quart of the mixture along the length of the body; in a few minutes it will have covered all parts of the skin and destroyed the ticks.

Question.— Is silage good for horses?

Mr. Witter.— It is not a natural food for them, although they like it. It should only be fed in moderate amounts.

Mr. Smallwood.— I think it is an excellent food for a mare with foal. At the present prices of grain I should feed it quite largely to all horses that are not working.

Question.— I have sheep whose eyes have become bloodshot and sightless. What is the cause and cure?

Dr. Smead.—An influenza is prevailing to which sheep and cattle are subject. It usually comes on at the beginning of the wet weather in the fall. It seems to affect the eyes particularly, and frequently causes blindness. It must run its course. Give good care and bathe eyes with water in which a little salt and a few drops of camphor have been added.

SOME OF THE GRASSES.

Question.— Would it be profitable to top-dress a meadow with commercial fertilizers, and when should they be applied?

Mr. Van Wagenen.— I do not believe it would with the prices that prevail here; it is being done extensively in Rhode Island. If it is to be used, probably nitrate of soda is the most desirable form; it should be applied in the spring.

Question.— Is orchard grass valuable, and how much should be sowed to the acre?

A Farmer.— It makes excellent hay if cut early; it is also good for pasture where the ground is not wet. We sow about one-half bushel to the acre.

Question.— What is the best grass for permanent pasture?

Mr. Cook.— A mixture of blue grass and orchard grass does well with us. Much depends upon the locality. Pastures may be greatly helped by top-dressing occasionally.

Question.— Will red top grass do well on low ground?

Mr. Van Wagenen.— Yes; it is unquestionably the very best for such land.

Question.— What is the feeding value of swale hay?

Mr. Van Dreser.— If it is cut as it should be, before it is too ripe, it is better than ripe timothy.

Question.— Which is best, early or late cut timothy and clover?

Mr. Rice.— For hay, the most feeding value is secured when the grass is cut before the seed forms. Then, too, there is a saving of fertility, which is required to ripen seed. Any grass is best when cut in an early stage. Good June pasture produces the best milk because the grass is fresh and young. We should aim to make the conditions just as near those of June as possible, to do which we should mow the grass before it has begun to deteriorate, which it does as soon as the blossoms begin to form. It is one of nature's plans and its greatest aim is to reproduce, whether in animals or plants. Do not allow that change to begin in hay; cut it early, whether it be clover, alfalfa or timothy.

Question.— Would you advise the sowing of crimson clover in corn or potatoes?

Mr. Van Alstyne.— In corn, ordinarily, no; the corn will shade the ground so much and the roots will take up so much room that the clover roots do not get their proportion of moisture and plant food. But in potatoes crimson clover does better. The great trouble is in the poor seed. Much of it is imported and is known as Egyptian clover. Get only pure native-grown seed; that raised as far north as possible. Crimson clover ought to be put into the ground four inches, which is much deeper than red clover is sown.

Question.— How long should a clover meadow be left before plowing it for corn?

Mr. Wing.— One must first know the nature of the clover plant. It is a biennial, that is, it usually dies at the end of the second year; sometimes, however, some of the plants struggle along to make seed; it is not advisable to keep a clover meadow longer than two years. If you want a clover sod on which to plant corn, do not sow any timothy seed with the clover seed.

Question.— What about clover, shall we seed with that when sowing oats?

Mr. Smith.— Much will depend on the condition of the soil and the amount of fertility in it. On some soils oats will grow while clover will not. There must be little or no acidity in the soil to get a catch of clover. If your soil is just right I would recommend sowing the oats early; then when they have been taken off, the fitting of the land properly and seeding with clover. The next year fully as good results will follow as if the clover had been sown with the oats, while the crop of oats was better.

Question.— How about vetch, is it better for food or to plow under?

Mr. Woodward.— There are two varieties. I have sown the "hairy vetch," and it went into the winter a mass of green; if it withstands the winter I shall consider it the ideal cover crop; it succeeds in the West, and I see no reason why it should not with me.

Question.— Is millet a good food for cows? Please state results from experience.

Mr. Witter.— German millet is a little larger than the Hungarian, and its analysis is between that of clover and timothy. Timothy is a poor hay for growing animals or for feeding cows in milk; its ratio is one to sixteen, while clover has a ratio of one to five-eighths. Millet, however, must be cut while in blossom, otherwise it becomes hard and woody. When cut early and properly cured it makes good hay?

Question.— What seed is best to sow for pasture?

Mr. Witter.— Sow medium red clover with some white clover, and red top and blue grass.

Mr. Rice.—Alsike is a good clover on upland, but does not succeed well on lowland. Orchard grass also makes good pasture.

ALFALFA.

Question.— Can alfalfa be raised on clay ground, and, if so, how should the land be prepared?

Mr. Dawley.— If the conditions are favorable to the growth of alfalfa there is no crop that can equal it for feeding purposes. It can be cut as early as anything, and the cutting may be continued till the frost kills it in the fall. The conditions of soil vary so greatly that I should dislike to say what this particular clay soil might do. Much of our most valuable alfalfa land in my section is a clay soil underlaid with limestone. The soil must be put in fine mechanical condition; if it is hardpan underneath it may be profitable to subsoil. We can afford to spend much time in preparation, as a good catch should last ten or twelve years. The best previous preparation is a hoed crop for one or two years; this will kill most of the weeds. When well established it is almost drouth proof by reason of its deep feeding. The alfalfa should be sown at the same time as oats, using from twenty-five to thirty pounds of seed to the acre. As soon as the weeds get the start of the alfalfa clip the field, and if the growth is not so much as to smother the young plants let it lie as a mulch.

Question.— What is the best kind of alfalfa, and where can the seed be obtained?

Mr. Cook.— There is but one kind in use in this country, although some experiments are being made with the Turkestan variety. The seed may be had of any seed dealer; it needs land in fine tilth, well fertilized and either naturally or artificially drained; it is a most valuable plant, and I believe that every effort should be made to establish it. When we know that eight pounds of bran contain no more feeding value than eleven pounds of alfalfa we can readily understand its worth. I know of a case where corn silage and alfalfa silage are the whole feeding ration, and good results are being had.

Mr. Hale.— I have been fairly successful with it; I have cut the third crop, having the past year about four tons per acre of the cured hay; I believe it to be the nearest to a balanced ration of anything we can raise.

Question.— Will alfalfa make a good pasture for hogs?

Mr. Van Dreser.— I have had no experience with it, but large quantities are raised in Minnesota for this purpose. Mr. Cook said that it was important that it should not be pastured so closely as to injure the crown.

Question.— Please give directions for growing alfalfa and your opinion as to its adaptability to St. Lawrence county.

Mr. Van Dreser.— I have the utmost confidence in it; I have seen it grown in Minnesota, where the climate is very severe. We sowed eleven acres last year and from it we cut forty-one large loads of hay. When we remember that the feeding value of eleven pounds of dried alfalfa hay is equal to eight pounds of wheat bran we have a better idea of its value. I advise everybody to try a small piece of it and to persevere till they are successful. The land must be well drained and have an open subsoil. Thorough preparation of the seed bed is necessary; we sow about thirty pounds of seed to the acre without any nurse crop; it should be cut as soon as it begins to come into blossom. Several of those present had tried it, but were unable to carry it through the winter.

Question.— Will alfalfa be a success in Cayuga county?

Mr. Clark.— Three things are essential; a rich, well prepared soil, a well drained soil and some lime. The soil should be thoroughly prepared and about thirty pounds of seed sown to the acre, using no nurse crop. When a few inches high clip and leave on the ground; this will kill the weeds and the alfalfa will be more stocky. Usually one crop can be cut for hay the first year.

Mr. Witter.— Mr. Dawley has made silage from alfalfa with the best results; his cows did better on it than on wheat bran.

Question.— Will the roots of alfalfa clog tile drains?

Mr. Mills.— If the drain carries water from a living spring they will, but if the drain is dry the greater part of the season there is little to be feared.

Mr. Worker.— I have had alfalfa in a field for eighteen years, and the drains are not affected. Speaking of alfalfa roots, I had an opportunity to trace the roots of a plant of two years' growth in a sand bank that was being excavated, and traced them for fifteen and a half feet; there were very few fibrous roots until near the end, where they were very plentiful. This shows its ability to feed in the subsoil.

Question.— Can we expect a cutting of alfalfa the first year?

Mr. Cook.— It depends upon the soil, and also upon the amount of rainfall. For two years we have had a good crop, cutting the equivalent of one and one-half tons of dried hay.

Question.— Is alfalfa good for pasture?

Mr. Witter.— It is hardly advisable here, although it is done largely in the West.

Question.— How much alfalfa seed should be sowed to the acre?

Mr. Witter.— I would sow thirty pounds, and would sow it alone. I consider the plant so valuable that I would make almost any sacrifice to get a stand of it.

Mr. Mills.— This plant has been grown very successfully in my section, and I have seen the best results with only ten pounds of seed to the acre. There they give it no more care than the common red clover.

Mr. Van Dreser.— I sowed eleven acres about the middle of May and clipped it the first of July, allowing it to remain on the ground as a mulch. Five weeks later it was cut again and yielded forty-one loads as large as could be drawn upon a seventeen-foot hay rack.

Question.— Is it advisable to sow oats with alfalfa, and how much per acre?

Mr. Dawley.— It evidently depends upon local conditions; I sow it alone on my soil. Wherever it is sowed with a nurse crop that crop should be cut green or the alfalfa is very likely to be injured.

Question.— Is there anything in soil inoculation?

Mr. Worker.— My experience leads me to believe in soil inoculation.

Question.— Please ask those present to give their experience in growing alfalfa. How does it compare in feeding value and productivity with other crops?

Mr. Van Alstyne.— I think this crop will do much to stop the buying of grain, as its feeding value is nearly as great as that of wheat bran. It should be cut before it comes fully into blossom. All early cut hay has a greater feeding value, and this is particularly true of alfalfa.

Mr. Abbey.— I have been very successful with alfalfa, and believe it the one thing needed to make our farm work successful. I would sow it alone, preferably in the spring, on good soil that has been well prepared and is naturally or artificially underdrained. It is important that it be rolled down firmly both before and after sowing.

Question.— How deep should alfalfa be covered? How long will it last as a hay producer?

Mr. Witter.— Mr. Dawley has a field that has been mowed for twelve years. It should be covered about as common clover.

Question.— What would you consider the best fertilizer for starting alfalfa?

Mr. Witter.— Stable manure is preferable as it adds so much to the water holding capacity of the soil.

Question.— Where alfalfa is winter killed in spots, would it be of any use to sow on more seed without replowing?

Mr. Van Alstyne.— It might, if the rest of the field is in good condition; I should try it; give such spots a top-dressing of fine manure or commercial fertilizer. Some farmers go over their alfalfa fields in the spring with the disc harrow with good results.

Question.— Will alfalfa make a good permanent pasture? Will it do well on clay soil or on sandy knolls?

Mr. Woodward.— It will grow on any soil that is well drained, but will do much better on rich land. Its greatest value is as a hay crop; it is not adapted for pasturing.

Question.— Should alfalfa be sowed alone, and how much to the acre?

Mr. Worker.— We are somewhat undecided as to the best amount of seed to sow to the acre. I do not believe it is necessary to sow half a bushel, as many recommend; I have had good results from sowing a peck; I sow it in spring, in the grain drill, with oats and peas; I put the grass seeder before the drill so that the seed will be well covered, which is essential. If sowed alone I should follow with a smoothing harrow. Our land is a gravelly loam and is naturally well drained; it is useless to sow it where the land is wet; if there are such spots in your field sow a little orchard grass on them, this will ripen with your alfalfa. I have known it to last ten or twelve years without running out. My best yield was five tons of dried hay to the acre; the last two years the yield has been less, owing to the severe drought, but it is not affected by dry weather as are other grasses, it being a very deep feeder. We make out first cutting about the middle of June and usually cut twice afterward. I consider its feeding value greater than that of clover, but do not let it get too ripe before cutting. Always sow in spring, on good ground that has been thoroughly fitted.

Mr. Hatch.— I do not believe that ours (Skaneateles) is a natural alfalfa soil; the subsoil is too hard. We should experiment in a small way. I believe it a most valuable crop where it can be raised.

Mr. Worker.— On some spots of heavy clay soil it has done well. Some use it for pasture, but I would not recommend it as the cattle are liable to injure the crown of the plant by trampling on it.

Mr. Stone.— I believe it can be grown on a greater variety of soil than we think; I have seen it doing well upon soil underlaid with hard pan. It is excellent food to use with silage.

CLOVER.

Question.— Can clover be sown after the peas have been taken off to the cannery, and should the ground be plowed again or not?

Mr. Rice.— I should think if the ground had been well prepared for the peas, and the vines removed, it could be prepared by the thorough use of the disc harrow so as to be in almost the ideal condition for seeding.

A Farmer.— The best results I ever had were from sowing the clover with the peas. The land was thoroughly prepared, and the peas taken off early in the season.

Question.— Shall we expect more than one crop of hay when seeding with clover?

Mr. Cook.— If the clover is cut twice the first year, each time before the seed has formed, there will be some the next year, but if a large cut is expected some timothy should be sowed with it.

Question.— Will it pay to sow crimson clover after cutting off a crop of hay?

Mr. Van Alstyne.— It may be sown as late as the middle of August with good results if the conditions are favorable. I would prefer to cut the hay early. Fit the ground and sow cow-peas; these may be cut for hay; there is sometimes difficulty in curing them in September, when they are ready to cut. The time is coming when cow-peas will be put in the silo with the corn, thus making nearly a balanced ration without additional grain.

Question.— Is sweet clover good for hay?

Mr. Witter.— In some sections of the State it grows naturally, and has been cut for hay, but I have no knowledge of its value.

Question.— What is the comparative feeding value of alsike and common red clover?

Mr. Witter.— I think the red clover would be better; alsike is a shallow feeder and does better upon wet ground than the other varieties.

Question.— Why does clover come in meadows which have been free from it for years?

Mr. Wing.— I do not know; experiments have shown that seed covered too deeply will germinate when brought near the surface. This may be one of the reasons.

Question.— When should clover be plowed under, in the fall or allow it to go until spring?

Mr. Gould.— Let it go till spring, then get the ferment when the crop is growing.

Mr. Smith.— The more we can turn under in the spring the more vegetable matter we shall have to make humus.

Question.— How much mammoth clover seed would you sow on an acre?

Mr. Wing.— I would say, not any if I want it for hay; if I wanted to enrich the ground I would sow from eight to ten pounds of seed per acre; it is too coarse for hay; I much prefer the medium variety of clover for hay.

Question.— What about clover, shall we seed with that when sowing oats?

Mr. Smith.— Much will depend on the condition of the soil and the amount of fertility in it; on some soil oats will grow, while clover will not; there must be little or no acidity in the soil to get a catch of clover; if your soil is just right I would recommend sowing the oats early, then, when they have been taken off, the fitting of the land properly and seeding with clover. The next year fully as good results will follow as if the clover had been sown with the oats, while the crop of oats was better.

Question.— Is it a good policy to seed a piece of land with clover alone?

Mr. Smith.— If I could grow clover, I would raise that by all means.

Mr. Gould.— Very many failures have come to a clover crop through sowing the clover with some grain crop such as oats. The reason is, the grain grows more rapidly than does the clover, and thus absorbs plant food and moisture needed for the clover. Good results are often reached by taking off a crop of oats, then using a disc harrow to fine the soil, after which ten quarts of clover seed are sown per acre. It will germinate and grow well enough before the close of the season to produce a good crop the next year.

POTATOES.

Question.— Should we plant large or small potatoes?

Mr. Rice.— I believe that the crop depends more upon the condition of the soil than on the size of the seed, although there is no doubt the continual planting of small potatoes will cause them to run out.

Question.— How can we maintain the eating quality of our potatoes?

Mr. Chapman.— By the selection of good seed of a good eating variety and growing them upon land that is naturally adapted to the potato. The land does much to determine the quality of the potato. I should not plant a whole potato; it will take too much seed, and it has been shown that only about four eyes will grow; if more are planted it is a waste of seed. I prefer a medium sized, uniform potato, and a typical one of the variety being planted; this should be cut in pieces about the size of a hen's egg.

Question.— Does potash in the form of wood ashes cause the potato scab?

Prof. Cavanaugh.— It does not, but if the scab germs are in the soil the potash or any other form of alkali will aid in their development. By following a rotation of crops and not planting potatoes on the same field oftener than once in three years we can get rid of the scab in the soil. To guard against the possibility of the seed being affected soak the cut seed in a solution of two ounces of corrosive sublimate to fifteen gallons of water; soak the seed for an hour; use a wooden vessel. All farmers should write to the Experiment Station for the spray calendar, which gives formulas for the preparation of all the fungicides and insecticides, and the proper time and manner of applying them.

Question.— What is the best insecticide for the potato bug?

Prof. Sirrine.— I should use the Bordeaux mixture and Paris green, and thus control the blight as well as the bugs. Arsenite of soda may be used with the mixture in place of the green; it is cheaper and stays in suspension better; it is made by boiling one pound of white arsenic and four pounds of salsoda in one gallon of water for fifteen minutes. Use one pint of this to each fifty gallons of water or the Bordeaux. If used with water, lime must be added to neutralize the caustic properties of the copper sulphate. It will be well to write the Experiment Station at Geneva or at Cornell, and get the bulletin giving complete information.

Question.— Is a high grade fertilizer the most profitable for potatoes in this section?

Mr. Brainard and Mr. Smallwood agreed that phosphoric acid alone had given them as good results as the complete fertilizers, but all should experiment for themselves.

Question.— What causes potatoes to be bitter?

Mr. Rice.— They may be unripe or it may be caused by exposure to the sunlight.

Question.— Does it pay to use commercial fertilizer on potatoes, and what is the best brand for that crop?

Mr. Cook.— This depends largely upon the local conditions and on what the nature of the soil may be. As a rule we can supply the necessary nitrogen in the manures and by growing the clovers. Most soils in this State have an abundance of potash if it can be made available; they are in many cases, however, deficient in phosphoric acid. We can supply this in the cheapest form of fertilizer, the South Carolina rock, and rarely need to buy the higher grade goods. The application of this will also tend to liberate some of the potash.

Question.— How should fertilizers be applied to potatoes, broadcast with a drill or in the row?

Mr. Rice.— The bulk of them should be drilled over the entire surface, but it is well to use a small amount in the row. Be careful that it is mixed with the soil so that the seed will not come in direct contact with it as it may be injured.

Question.— Why does Mr. Chapman put the phosphate below the seed?

Mr. Chapman.— The amount of available food that the plant gets during the first two weeks largely determines its future. When I am using only a little fertilizer as a starter I prefer to have it where the first feeding roots will get it. The crop will no doubt get as much value from it if it is put above, but not as quickly.

Question.— What caused the potato blight this season?

Mr. Van Alstyne.— The rot is caused by a spore which may live in the soil or on the potato. These spores fall upon the vines, and if the weather conditions are favorable will multiply very rapidly and cause the diseased condition known as blight. The most favorable conditions for its development are hot weather and moisture; this explains its prevalence last year. It may be prevented by keeping the vine sprayed with Bordeaux mixture; it must be applied several times, so that the new growth may be kept covered and no opportunity afforded to spores to find lodgement where they can grow.

Question.— When should we spray for potato blight? Should we use the Bordeaux mixture, and how much Paris green should be added?

Prof. Beach.— Begin when the vines are six or eight inches high; spray as often as required, depending on the weather conditions; warm, close weather is favorable for its development; no rule can be given to fit all cases. Use one pound of Paris green to 150 gallons of water. The dry Bordeaux has been tried to some extent in Kansas and other States where the supply of water is limited, but the results are hardly as satisfactory as where the regular Bordeaux is used.

Question.— Would you plant two successive crops of potatoes on the same field if the first crop was affected with the rot?

Prof. Sirrine.— I do not think that it would matter as far as the rot was concerned, but it is not considered a good practice; if the potatoes were scabby the following crop would very likely be affected.

Question.— What is the best time for planting potatoes?

Answer.— This is entirely a local question. It will depend on the variety planted and the local conditions.

Question.— Why are early potatoes more liable to be affected by the blight than late ones growing beside them?

Prof. Sirrine.— I attribute it to the fact that the early potatoes were at the time more bushy and the lower leaves, which were first affected, did not dry off as rapidly, and thus gave the conditions most favorable to its growth. Spraying to kill is never so satisfactory as doing it to prevent; seventy-five per cent. of the fungus diseases can be prevented by timely spraying.

Mr. Cook.— The reason why spraying is so beneficial is that the growth of the tuber takes place principally during the last three weeks; if the foliage is kept healthy the growth of the tubers will be much greater.

STABLE MANURE AND OTHER FERTILIZERS.

Question.— Is it advisable for farmers to purchase commercial fertilizers?

Mr. Dawley.— I believe that as a general thing on soils that have been cropped as long as ours have the mineral matter taken out has been in excess of what has been supplied and become available. I believe that we can profitably purchase this in commercial fertilizers; we can supply the necessary element, nitrogen, very largely by growing cover crops and the use of clover; our farms and fields differ so greatly that each must decide for himself what treatment is needed.

Question.— Which is the better way to apply commercial fertilizers, in the drill or over the whole field?

Answer.— It depends upon the amount used; if one-half ton to the acre, spread it uniformly; where only a small amount is used sow it in drills with the grain.

Question.— Is it advisable to top-dress oats with nitrate of soda, and, if so, how much should be used?

Mr. Van Alstyne.— I would not use it, as the tendency is to make a rapid growth of straw rather than to perfect the grain; on oats I use nothing but the phosphoric acid in the form of South Carolina rock.

Question.— Will it pay to put nitrate of soda on good clay ground as a top-dressing on meadows, and, if so, how much should be used?

Mr. Van Alstyne.— Not if the land is in good condition and producing freely. If there is a good stand of grass, but it is not doing well, an application of 150 or 200 pounds to the acre has been very beneficial to my fields. It should be sown broadcast as early in the spring as possible. The cost is about $45 per ton.

Question.— What is the comparative value of land plaster and South Carolina rock?

Prof. Cavanaugh.— The former is a sulphate of lime, and has no direct fertilizing value; it helps to make some of the fertility in the soil available. South Carolina rock contains phosphoric acid and lime; the former element is valuable as a fertilizer.

Question.— Does the South Carolina rock tend to stimulate the growth of oats at the expense of the following crops?

Mr. Cook.— It has certain stimulating effects, as the land plaster it contains will unlock some of the potash and make it available. The only effect on the following crop is to use up some of the humus; this we must be constantly striving to replace.

Question.— What per cent. of phosphoric acid does Carolina rock contain?

Mr. Cook.— Ordinarily fourteen per cent., but sometimes it may be bought analyzing sixteen per cent.

Question.— Where can I procure South Carolina rock?

Mr. Cook.— Of any dealer in commercial fertilizers.

Question.— Is salt a fertilizer?

Mr. Rice.— It is not a direct plant food; that is, it does not contain either potash, phosphoric acid or nitrogen. It does, however, by its mechanical effect, break down, liberate and make available some of these elements already in the soil in an unavailable form.

Question.— Is lime a fertilizer?

Mr. Wood.— Lime is said to be good to use on a sour soil, but how can one know that his land is sour? It is usually the higher lands from which the vegetable matter has all been farmed out, rather than the low lands as many suppose. It may be tested by the use of blue litmus paper; take a small amount of moist soil and place the litmus paper in it, firmly packing the dirt around it and then if the paper turns red after a little it indicates the presence of acid. It may be sweetened by using lime, ashes or large amounts of stable manure.

Question.— What is the fertilizing value of cabbage?

Mr. Tice.— I cannot say from the chemist's standpoint, but I have observed very marked results where the refuse and the trimmings have been applied; they seem to be particularly rich in nitrogen.

Question.— What can we afford to pay for Canada wood ashes?

Mr. Van Alstyne.— I would only buy on the guaranteed analysis. At the usual price of ten dollars a ton they should contain at least five per cent. of potash and one and one-half per cent. of phosphoric acid; they are dear at this.

Question.— What should we pay for wood ashes when the muriate is worth thirty-eight dollars per ton?

Mr. Tallman.— The figures show that ashes containing four per cent. potash should sell for six dollars a ton when the muriate is worth thirty-eight dollars. Mr. Witter urged the advisability of buying only upon the guaranteed analysis. He also spoke of their value in sweetening the soil, thus rendering it more congenial for the clover.

Question.— Does the Geneva Experiment Station analyze ashes free of charge to the one sending them?

Mr. Van Alstyne.— They will do such work only to a limited extent, as with the analyses of the many samples under the fertilizer control and the inspection of feeding stuffs there is little time for outside work.

Question.— Would you advise spreading manure daily, if the snow was twelve inches deep, on land intended for oats and corn next year?

Mr. Van Wagenen.— I certainly should; I will not say there will be no loss, particularly if it is spread upon ice and a heavy rain should come before a thaw, but I do believe there is less loss than in any other way. At no time can it be handled with as little labor as day by day. We should have tight gutters and a tight box for hauling that there may be no loss before reaching the field. The most satisfactory way is to line the box with galvanized iron.

Question.— What is your opinion of a manure shed with a cement floor?

Mr. Cook.— If I had such a shed I would certainly have a cement floor, but I do not favor such a shed; I believe it is better to draw the manure to the field daily.

Question.— Should the manure be kept in the barn with the cows?

Mr. Rice.— It should not, although manure will be better for being so kept; the bad odors will surely affect the quality of the milk, and in time the health of the cow herself.

Question.— What is the relative value of hen manure and stable manure?

Mr. Van Alstyne.— Much depends upon the quality of the manure; if properly cared for the hen manure is worth about six dollars a ton, and stable manure one-third as much.

Question.— What is the manurial value of the scrapings from the city streets?

Mr. Rice.— I should suppose that with the amount of dirt with which they are mixed and the frequent washings they have had that their value would be small. They may pay for the hauling.

Question.— What do you think of the cow-pea as a fertilizer for this section of the State (Mohawk valley)?

Answer.— There is no question of their value where they can be grown, as they add both nitrogen and humus. The conditions here are so similar to those in the Hudson valley, where it is successfully grown, that it would seem to be profitable here. The common mistake has been to sow them too early. They should not be sown before the last of May or the first of June.

Question.— What is the fertilizing value of shavings that have been used for bedding, and do they have any injurious effect upon the soil?

Mr. Van Alstyne.— The experiments that have been made go to show that it does not injure the soil, but on the other hand are so slow to decay that they have little value as compared with straw.

Question.— What is the relative manurial value of brewers' grains and bran?

Prof. Cavanaugh.— You can safely figure the nitrogen, which is the fertilizing element we are seeking, at one-sixth of the amount of the protein. The bulletin shows that the brewers' grains are about eighteen per cent. protein. They would therefore have about three per cent. of nitrogen; by the same rule we find that bran has more than twice the manurial value.

Question.— What is wanting in a muck soil to make it grow grain of fair weight?

Prof. Cavanaugh.— The muck deposit is usually high in nitrogen, but is apt to be deficient in the mineral elements. Apply lime, preferably in the form of the South Carolina rock and wood ashes, and use no fertilizers of a nitrogenous nature.

Question.— Where is phosphoric acid obtained?

Mr. Cook.— From bone, South Carolina rock, etc. The ground South Carolina rock is treated with sulphuric acid; this makes the phosphoric acid which it contains available for plant food. The rock containing fourteen per cent. of this element can be had at your station for $12.75 a ton, with a reduction of five per cent. for cash. The manufacturers are required to place upon the sacks a guaranteed analysis of their contents. This form of phosphoric acid is just as valuable as that obtained from ground bone.

Question.— To what crop can stable manure best be applied?

Mr. Cook.— We have changed our methods somewhat; formerly it was all applied to the corn ground; now we spread it upon our young clover; this insures us a good crop of clover, frequently two cuttings, and we have a good clover sod to plow under for corn the next year.

Question.— Where does Mr. Cook apply the manure during the summer season? Does it trouble the hay in the next year?

Mr. Cook.— This is the weak part of our plan. We have to pile it during the summer, as we do not think it profitable to build a manure shed for the little we have at that time. If there is much straw in it it might hurt the sale of the hay somewhat, but where the hay is fed upon the farm, as ours is, there is no loss and but little inconvenience.

Question.— Is kainit ever adulterated?

Mr. Rice.— I have never known of its being so. The freight from Germany, where the kainit is produced, would be greater than the cost of an adulterant itself. While the salt may unlock some of the plant food in the soil, it is considered better to do it by tillage and use the money to purchase direct acting fertilizers.

Mr. Young.— I have used kainit for several years with satisfactory results. There has been an increased yield of grapes and a better growth of the vine. I think it has also checked in a large measure the shelling.

Mr. Spencer.— My plan is to use phosphoric acid to promote the growth of the cover crops, and when these are turned under they put this element back where the grapes can get it, and also furnish humus and some nitrogenous matter.

Mr. Rice.— Each should study what the crop requires and what the soil contains, and then purchase the element needed wherever he can buy the best for the least outlay. As a general rule we may say that the nitrogen promotes the growth of the straw, the potash hardens it and the phosphoric acid is used to perfect the grain.

Question.— Why not use commercial potash to correct the acidity in the soil instead of in the form of wood ashes?

Prof. Cavanaugh.— It will not do it; neither the muriate nor the sulphate of potash has any effect in this direction. That property belongs to the carbonate of lime and of potash which is found in wood ashes.

Question.— Does not the free sulphuric acid in the treated South Carolina rock dissipate in a wasteful degree the humus in the soil?

Mr. Van Alstyne.— Ordinarily there is no free acid; it unites and forms sulphate of lime or land plaster.

Question.— An old phosphate agent wishes to know, if South Carolina rock is as good as animal bone, why Mr. Van Alstyne formerly bought the pure ground bone and now buys rock?

Mr. Van Alstyne.— Because I can buy a greater amount of more readily available phosphoric acid for less money in the rock than in the bone.

Question.— What fertilizer should we use to cause a high color on our fruit?

Mr. Van Alstyne.— Potash more particularly. Phosphoric acid will tend to form fruit buds. On my farm I use a mixture of 300 pounds of fourteen per cent. South Carolina rock and fifty pounds of potash, applying eight to ten pounds to each growing tree and up to one-half ton per acre in the older orchards. I would scatter it as far as the roots extend and as early in the spring as possible. You must remember that this year's application will show little effect till next year.

Question.— What is the value of ammonia?

Prof. Cavanaugh.— Ammonia is a form of nitrogen which is the most expensive of all the elements of fertility; it has two separate values; its commercial value is from fourteen to sixteen cents a pound in the form of nitrate of soda or dried blood, and sixteen to ten cents if bought in the mixed goods; it is a constituent of the humus; if humus is abundant its value is not so perceptible as in soils where it is lacking. No definite rule can be given; if the straw has a rank, heavy growth it indicates an abundance of nitrogen, and if it is short and yellow it shows very clearly that nitrogen is lacking.

Question.— On soil of average fertility, does it pay to use a high grade commercial fertilizer?

Mr. Gould.— There is too much average everywhere. We have a whole lot of average farmers, and some who don't get up there even. Then there are the "average cows," and the average crop; none of them return a profit. If your soil is in good condition you may profit from using some commercial fertilizers if you know what the crop you propose to grow needs; otherwise you will not.

Question.— Where can land plaster be obtained?

Mr. Smith.— It may be bought at Fayetteville, Onondaga county, and perhaps in some other place nearer here.

Question.— How would you apply commercial fertilizers to a garden?

Mr. Rice.—As a rule, I think commercial fertilizers on a garden ought to be put in with a drill. Sometimes it is well to put a little fertilizer in the hill. A fork-full of well-rotted manure under the hill may safely be used; but in larger dressings sow commercial fertilizer broadcast.

Question.— If you keep thirty cows on a twelve-acre pasture every night for six months, what would be the fertilizing value of their voidings in your opinion, and what is the difference in the value of the liquids and solids?

Mr. Smith.— The voidings of the cows are worth, according to experiments made, from six to ten cents each daily, depending upon the cow and the feed she has.

Mr. Van Wagenen.—As a rule the voiding of thirty cows is worth one dollar every night. If they are allowed to run in an acre or so of night pasture it will soon be over fertilized. It were much better to allow them to run in a large pasture, but I prefer to have them kept in a stable at night, then take care of their voiding as it is needed every day. Our object should be to diversify fertility, not to concentrate it on a small area. When cows are allowed to run in a pasture they leave some of their fertility beside the barn and some of it along the fence or elsewhere.

Question.— Does it pay to spread green manure on the snow in winter?

Mr. Smith.— How many farmers present think they will lose in the value of manure if it is drawn out and spread on the snow? But very few hands went up in answer to the question.

Mr. Smith.— All our experiments prove that a less loss is met when manure is so spread than when it is left in piles in the field till spring. Wherever such piles have been left there is always an increase in the crop grown on that field the next year. This was caused by the washing out and carrying down into the soil, by the rains, of the potash and phosphoric acid. There would be no loss of nitrogen unless enough heat is generated to turn the nitrogen into ammonia, and so allow it to escape in the process of evaporation.

Question.— Which will give the better results, to spread manure on the snow in winter or leave it in the sheds until spring?

Mr. Smith.— If the manure is left under a water-tight shed and is kept moistened there will not be much, if any, loss, but if it is thrown out and left under the eaves of the stable there will be great loss. Professor Roberts has found as much as sixty per cent. loss in manure so left one year. As a rule the best and most profitable way to dispose of manure is to draw it out and spread it every day it is made. There will be no loss when spread on the snow.

Mr. Rice.— The greatest value of manure is when it is first made, and more than one-half of it is in the liquids; when the manure is thrown out and left till spring nearly all the liquids are lost. Unless the manure is to be put on steep hillsides, I would draw it out every day it is made and spread it where it is to be used. Put the horse manure into the gutters behind the cows; also the bedding, to absorb the liquids, then draw out the whole mass. The most disagreeable work in the spring is that of drawing manure thrown out and piled up under the stable windows, where it has laid all winter; it is a terrible waste of manure, and causes additional work. It is well to add some South Carolina rock to the mass in the gutters behind the cows. It is the best absorbent known, and is rich in phosphoric acid, an element needed in the manure.

Question.— What per cent. of fertility is represented by the liquid portions of manure as compared with solids, and how shall we best conserve the same?

Mr. Smith.— In the solid manure of cattle there is $1.14 value in phosphoric acid and potash, and $2.23 worth in the liquids; this is for a ton. The best way to apply it is to get it on the land as quickly as possible after it is made. Professor Roberts is the authority for the statement that manure left in piles in the barnyard one year loses sixty per cent. of its value; this loss is chiefly in nitrogen. Experiments have been made at several experiment stations with the view of ascertaining if there was much loss in manure that was drawn out every day and spread where wanted; the result showed scarcely any loss, while there was a loss in manure left in piles in the fields; the differences were easily seen, the fertilizing element having gone into the land under the piles. There must be a sufficient degree of heat to cause a loss of nitrogen, but phosphoric acid and potash, being minerals, leach out and go down into the ground under the piles.

Question.— Does it pay to buy commercial fertilizers?

Mr. Smith.— Not unless they are bought and used intelligently. First find out what elements of plant food the crop needs, then be sure the elements are in the fertilizers; next, put on enough; do not go on the plan of using not more than a couple of hundred pounds on an acre; no man having intelligence would think of getting much result from one load of manure spread out over an acre of ground, and yet he will put on not more than 200 pounds of a fertilizer, then growl because he did not derive any benefit from it.

Question.— How much commercial fertilizer can one profitably use for a crop?

Mr. Smith.—I don't know. On Long Island, where experiments were conducted by the Station at Geneva, results showed that not more than 1,000 pounds of suitable commercial fertilizers could be profitably used for potatoes on an acre. It would all depend on the condition of the soil, what crop one wished to grow, and whether or not there was vegetable mold enough in the soil to hold moisture to release plant food. The value, variety and kind of crop would have to be taken into consideration. One crop would require more, another less of nitrogen or potash. It would be an experiment to find out how much, if any, commercial fertilizer one could profitably use.

Question.— Does the use of commercial fertilizers hasten the maturing of a crop?

Mr. Smith.— It would depend. A bag of fertilizer on an acre of land does not amount to much; no farmer having much intelligence would think of attempting to fertilize an acre of land with one load of barn manure scattered broadcast, and yet there are farmers who expend money for fertilizers and use them just as sparingly. No benefit will result from using a commercial fertilizer in that way, however good it may be. A fertilizer applied only in a hill of corn would give no return after the roots of the corn plant had extended beyond it; its only benefit would be in stimulating an early and rapid growth for a while.

Question.— What is the loss in fertility of stable manure kept in a barn cellar when all, or nearly all, the liquids are saved and spread after harvest or lay spreading from the stable in winter, when all or nearly all the liquids are lost?

Mr. Smith.— The liquids are worth double that of the solids in farm manure. These liquids are usually lost as manure is kept; to retain them some absorbent such as land plaster, South Carolina rock or road dust should be used in the gutters behind the cows. If liquid manure is mixed with the solids and put into a manure cellar some of these absorbents would have to be used, else there would be a loss of nitrogen in the form of ammonia just as soon as heat enough was produced to produce fermentation.

Question.— Is there more potash in wood ashes than in lime?

Mr. Smith.— There is practically no potash in lime; in good wood ashes there is, as a rule, about five per cent. of potash, all available; but unless ashes are bought with a guarantee, or you know who made them and what wood was used, one had best buy muriate of potash. It would depend on the crop one wanted to grow, to decide whether he should use the muriate or sulphate.

Question.— Where does nitrogen come from?

Mr. Smith.— We get it in fertilizers. Nitrate of soda, dried blood, tankage and some other ingredients furnish it. The legume plants, such as peas, beans and the clovers, furnish it. As a rule the most needed in our soils is available potash and phosphoric acid. The nitrogen in barn manure and that derived from the atmosphere by the legumes is as a rule available for the use of the plants.

ORCHARDS — SPRAYING AND INSECTICIDES.

Question.— Are the gasoline and the steam power sprayers now on the market practical for the average farmer?

Mr. Udell.— We used a steam sprayer one season and it gave good satisfaction; but as it needs a specialist to run it we dispensed with it. Taking one orchard with another I believe the hand power preferable.

Mr. Gallup.— I have used a steam sprayer. To my mind there is no other way to spray than by power, but I shall change to gasoline as it is simpler than steam. I believe it is the best power we can get for all purposes on the farm.

Mr. Wadhams.— Mr. Gallup is a natural mechanic; we cannot all do as he does. What we want is something that the average farmer or the average farm laborer can operate with little or no danger of giving out at a critical moment.

Prof. Beach.—As the spray should be fine or mist like, it seems to me that for putting it on as it should be, more power is needed than we have in the hand pump.

Mr. Van Alstyne.— It seems that we agree upon this; if a man has an aptitude for mechanics he may use the power sprayer. There is no question but that it does the best work, but for practical utility among all classes I do not think the hand pump can be superseded.

Question.— Why will not a weak solution of copper sulphate answer in spraying in place of the Bordeaux mixture?

Prof. Sirrine.— It will not adhere as well as when combined with the lime, and unless the solution is very weak there will be danger of burning the foliage.

Question.— How can apples best be kept from rotting?

Mr. Van Wagenen.— Spray the tree thoroughly so that it will be free from disease and the fruit can mature perfectly; then keep the fruit in a temperature as near freezing as possible.

Question.— Can anything be added to the Bordeaux mixture to make it more adhesive?

Prof. Beach.— Numerous experiments have been made, but nothing satisfactory has been found. Bordeaux mixture, if properly made, will adhere well.

Question.— How can we destroy the currant worms that appear on the bushes in early spring?

Prof. Bailey.— Use the Bordeaux with a little Paris green added; this will not only destroy the worm, but will also prevent the blight, which so often causes the leaves to fall prematurely. It will be necessary to spray a second time later in the season when the second crop of worms appears.

Question.— How would you kill the apple-tree worms without injuring the trees?

Prof. Sirrine.— Spray with the Bordeaux mixture, to which the arsenical poison has been added; this will destroy the insects and also prevent the apple scab. The first application should be as the buds swell, the second as the blossoms fall and a third about two weeks later.

Question.— What causes the bitter spots in apples?

Prof. Harding.— It is a fungus growth that finds its entrance where the skin has been cracked by the apple scab. It has been very destructive the past year. The remedy is to spray thoroughly with the Bordeaux mixture.

Question.— How can we keep the cut-worm out of the apple trees?

Prof. Sirrine.— What is known as the climbing cut-worm may be killed by mixing dry Paris green with bran and middlings in the proportion of one to twelve and scattering around the base of the tree. The borer must be dug out; wrapping the lower part of the trunk with tarred paper will cause the eggs to be deposited higher up and the borers can be more readily dug out.

Question.— Please prescribe for my Oldenburg apple trees. When fifteen or twenty years old the bark peels away close to the ground and soon the trees die. The King is somewhat similarly affected.

Mr. Willard.— It is probably the apple canker. The King is specially subject to this. Thorough spraying with the Bordeaux will help to prevent it.

Question.— What is the proper mixture to use to combat the aphis so plainly seen on apple trees at present?

Prof. Beach.— A good strong spraying of soapsuds of some kind; apply it early, as soon as they hatch.

Question.— Is the pink rot a new disease, or has it been here before? Will spraying late in the season check it?

Prof. Beach.— It is not a new disease, but this year the conditions favored its unusual development. Some have found a late spraying effective for the late scab that appeared in some sections last year. If the apple scab is prevented the pink rot will not appear, as it cannot penetrate the healthy skin of the apple.

Question.— Is the dust sprayer what we want for our apples?

Prof. Beach.— It has been developed more in the drier parts of the country, particularly in Kansas. I do not believe it practical for the scab where the rains are so frequent as here, but it may be of value in destroying insects.

Albert Wood.— It has been highly recommended, and I shall try it in a small way this year.

Prof. Bailey.— The reports are favorable where it has been tried. The question seems to be whether the dust will adhere or not.

Mr. Van Alstyne.— I believe in "proving all things," but at the same time "holding fast to that which is good." We know the liquid Bordeaux is effective, and I believe we should try the dust treatment in a small way until we have proved its merits.

Question.— How late is it possible to spray for the leaf curl?

Prof. Beach.— I should prefer doing it in March rather than waiting till April; I have known it to be done in April with no bad effect; it must be done before the buds swell. The copper sulphate may be used alone with good results, but I prefer the

Bordeaux mixture as it adheres better and you can also see where you have sprayed.

Mr. Van Alstyne.— The safe time is just before the leaves open, as the foliage is very tender and liable to be injured by the Bordeaux if you wait till it is fully opened. It can be used after the leaf hardens, but that is too late for the curl.

Question.— What shall we do for the blight on the cucumbers?

Prof. Sirrine.— If it is the downy mildew, as I judge from the description it is, spray with the Bordeaux, beginning about the last of July. The first application should be about one to twelve, but the strength of the mixture may be increased after the vine becomes harder.

Question.— Why do quinces crack and spot on good ground, and tree well sprayed?

Prof. Bailey.— The spot is probably due to a fungus growth, but the cracking may be from over-ripening. Proper spraying should prevent the spot.

Question.— How can we best get rid of the apple-tree caterpillar?

Mr. Van Dreser.— We spray with Paris green, as we do for the potato bug, when the worms are quite small.

Question.— Will Professor Sirrine tell us how to destroy the striped cucumber bug?

Prof. Sirrine.— You should study to prevent it. When the plants are young they may be protected by covers of cheese cloth or some similar material, but be careful not to leave it too long and stunt the plant. This is only for the garden. If growing them on a large scale, plant a trap crop of squashes either around or among the cucumbers; the bugs will feed upon these in preference to the cucumbers. I know of no way of keeping them off the squash. A weak solution of Bordeaux mixture with some Paris green added may also be of value.

Question.— What will kill the weevils that infest the beans and peas?

Prof. Cavanaugh.— Place the grain to be treated in a tight box with a cover, and on the grain set a dish with a little of the carbon bisulphide; the fumes of this being heavy will settle the carbon bisulphide through the grain and effectually destroy all insect life. Keep it away from fire in any form as it is very explosive.

Question.— Why do pears crack as they commence to ripen, and what will prevent it?

Prof. Sirrine.— It is no doubt due to the scab which is so common to apples and pears; it attacks the foliage as well as the fruit. Thorough spraying with the Bordeaux mixture will prevent it. The first application should be as the buds swell, the second after the blossoms fall, and a third about two weeks later. Use some of the arsenical poisons with it to destroy any injurious insects. Write to the experiment stations for full information on spraying.

Question.— Is there any remedy for pear blight?

Mr. Van Alstyne.— I have been tempted to give up the business as the blight has been so destructive. Lately I have learned that where the trees are forced the growth of wood was soft and very susceptible to the blight. I now grow them slower, producing a more vigorous and harder wood, and the trouble is much less. When any blight appears it should be cut off into the sound wood and the infested parts destroyed.

Question.— When and how often should spraying be done for the black rot?

Prof. Beach.— You should begin when the first leaves are one-third grown; if badly affected at least five applications will be needed; they should be from ten to fifteen days apart, according to the weather conditions; it is caused by a fungus disease that lives through the winter in grapes that remain on the vine; these mature their spores in the spring, and they float about and attack the new fruit; it first appears as an orange-colored spot on the leaf, but it is not usually recognized till it attacks the fruit; these spores fall from the leaves to the fruit or are washed down by the rains, hence the importance of keeping the leaves free from the disease. Damp weather and the lack of air drainage are favorable conditions for its development. It is important that the spraying be done in season, for if the spores are once on the leaf the spraying will have no effect. Use the Bordeaux mixture of the same strength as for apples.

Question.— Is the black rot likely to be more prevalent next year?

This led to an experience meeting as to the effects which had been observed from previous sprayings; also as to whether it was becoming more serious year by year. It was discussed by Mr. Youngs, Mr. Hawkins, Mr. Walker and others. A difference of views were expressed. Some were encouraging and some otherwise. Professor Beach said in conclusion that from his observation and experience he was sure that it could be controlled in any vineyard in New York. In spraying there should be power enough to make a fog over all parts of the plant, and it should be done at the right time.

Question.— What is the crown gall and what trees are most affected by it?

Prof. Beach.— It is an excrescence on the roots of the tree near the surface of the ground; it is not well understood; raspberries and cherries are affected, and apples also, to some extent; it is more common farther south.

Question.— How can we avoid the peach rot?

Mr. Willard.— We should select those varieties which are not particularly susceptible to it; the white sorts are very liable to rot. Thorough spraying before the buds open will aid in keeping it in check, but it must not be used after the foliage is out.

Question.— What is the most effective remedy with the grapevine root worm?

Prof. Slingerland.— Give thorough and frequent cultivation, especially close around the vines, during June and July; this will break the pupa cases and destroy the insect before it reaches maturity. I believe this treatment will prevent the grape-root worm from becoming a serious menace in any vineyard. For poisoning the beetle I would recommend spraying twice, about June twenty-fifth and July fifth, using four pounds of arsenate of lead to 50 gallons of water. Full information on this subject will be found in Bulletin No. 208 of the Cornell Experiment Station.

Question.— Will the apple scab be more prevalent next year because of its abundance this year?

Prof. Beach.— Not necessarily; it will depend more upon the conditions of the weather.

Question.— How is the mixture prepared to spray for San José scale? (See article on "Spraying" in this report.)

Mr. Van Alstyne.— Forty pounds of lime, thirty pounds of sulphur and fifteen pounds of salt; boil in thirty gallons of water and when thoroughly dissolved add thirty gallons more, this will dilute the preparation to its required strength and also cool it to the proper temperature for using. It should always be used before the foliage comes out. I usually add six pounds of the copper sulphate and thus hope to prevent the apple scab also by the same treatment.

Question.— What can be done to prevent the grayish-black spots on peaches before they ripen?

Prof. Beach.— This is probably due to a fungus. Such diseases are difficult to treat upon the peach, as a preparation strong enough to kill the fungus would destroy the peach foliage also. A spraying for leaf curl before the buds open might help to keep the other fungus growth in check.

Question.—What is the best spray poison to use in an orchard?

Mr. Van Alstyne.— I prefer the following preparation: one pound of white arsenic, four pounds of salsoda and five quarts of water boiled together for half an hour. Use a quart of this to each fifty gallons of Bordeaux mixture. It is cheaper than Paris green and stays in suspension much better.

Question.— How should oats be treated to destroy the smut?

Mr. Cook.— Either the formalin or hot water treatment may be effectively used. The latter consists of soaking the seed in water at a temperature of 133 degrees, and it should not go above 135 degrees or the germinating power of the oats will be injured, neither should it go as low as 130 degrees, or all the smut germs will not be destroyed. By the other method we use one pound of formalin to thirty gallons of water; this mixture will treat twenty-five bushels of grain; the seed may be soaked in a vat, or if this cannot be had spread the oats upon the floor and sprinkle and turn until they are thoroughly saturated. It will be necessary to dry them before sowing. The seed may be treated in this manner several weeks before sowing. I believe that it not only kills the smut spores, but helps the germination of the grain as well.

Question.— What causes the diseased appearance of the foliage of our orchards even when thoroughly sprayed?

Prof. Beach.— This season was peculiar in the amount of rainfall, yet those who were persistent were able to spray at the proper times. Late in the season many reports came to the station that the leaves were showing injury; an investigation showed this to be the case, and also that the sprayed orchards were the most affected. The compound of sulphate and lime as it is in the Bordeaux mixture is insoluble in water under ordinary conditions; yet it has been found that water in connection with the juice of plants has a solvent effect on the sulphate. Our explanation of the injury is that the unusually large amount of water upon the foliage had taken up some of the juices of the leaves, and by acting upon the mixture had given it the caustic property. A contributing cause was the tender leaf which was due to the excess of cloudy, wet weather. I would recommend the usual sprayings at the proper times, and if the excessively wet season should again occur, to use double the amount of lime in the mixture. The fungus that attacked the fruit late in the season could only grow where the skin had been injured either by a wound or more commonly by the apple scab. The remedy was obvious.

Question.— How may we know the San José scale, and how can it be destroyed?

Prof. Lowe.— It is very important that the fruit grower should know this insect and how to combat it. Several reasons combine to make it one of the most dangerous of our insect pests; it feeds by sucking the sap from the leaf, the twig or the fruit, and so cannot be reached by any of the arsenical poisons; it multiplies with great rapidity; it is most readily noticed by a discoloration of the fruit, causing reddish spots; it is distributed in various ways, sometimes it is brought into the orchard on nursery stock; it can spread but little by its own motion, as it only moves for a few hours of its life and can move but a short distance even under the most favorable conditions; it soon settles down and thereafter it never moves. The insects and birds are the most common means of its distribution. It is now becoming quite common in most sections of the State, and will do incalculable damage unless kept in check. The difficulty has been to find a mixture of sufficient power to destroy the scale and not injure the tree. Crude petroleum, whale-oil soap and kerosene have been used with fair success, but the best remedy yet discovered seems to be the lime, sulphur and salt solution. This consists of a mixture of thirty pounds of lime, twenty pounds of sulphur, fifteen pounds of salt and sixty gallons of water; slake the lime thoroughly till you have the milk of lime, place this with the other ingredients in half the amount of water and boil from one and one-half to two hours; then add the balance of the water and boil for a half hour longer. The trees should be sprayed as the buds begin to swell. This may be used in connection with the Bordeaux mixture. It is important that the spraying be very thoroughly done.

Question.— What is your formula for Bordeaux mixture?

(See directions for making all spray mixtures in this report.)

Question.— How do you prevent the borers from attacking your trees, and how do you destroy them if they are present?

Mr. Van Alstyne.— The various washes are not as a rule effective. By banking up the tree with earth we cause the eggs to be deposited higher up where the borer may be more readily found. Covering the trunk with paper for eight or ten inches from the ground will keep them off largely. Any that appear should be dug out.

Question.— Will it pay to scrape the bark of our fruit trees?

Mr. Van Alstyne.— It was our former practice, but we have since found that if the trees are thoroughly sprayed with the Bordeaux mixture scraping is unnecessary.

Question.— What causes the rough black spots on the apple tree limbs?

Mr. Van Alstyne.— It is the apple canker, the spore of which lodges at some point where the bark is injured. All affected parts should be cut out and burned and the tree thoroughly sprayed with Bordeaux mixture.

Question.— What will prevent mildew on grapes?

Answer.— Bordeaux mixture, thoroughly applied, will be found a perfect preventive.

Question.— Why not spray fruit trees when in blossom?

Answer.— It will kill the bees that are so necessary in pollenizing the fruit and in many cases will kill the blossom itself, and is against New York State law.

Question.— What is the cause of black knot on plum trees? Is there any remedy?

Prof. Stewart.— It is a fungus disease, the spores of which lodge upon the limbs, usually taking root where there is an injury; it forms the hard, black substance which gives it its name;

it should be cut out before the middle of January, at which time the spores have matured; cut three or four inches below the knot that all the infected part may be removed. If it is at a point that cannot be cut off remove as much as possible of the diseased part and apply kerosene. All infected parts should be burned. Bordeaux mixture tends to prevent it.

Question.— What causes, and what will prevent, the rotting of plums while they are maturing?

Prof. Van Deman.— The cause is a fungus disease; the remedy, spraying with Bordeaux mixture early in the spring, and again later in the season. The second application should be only one-half strength, as the foliage is more tender than that of the apple.

Question.— What causes the black spots in Baldwin apples?

Prof. Van Deman.— Neither the cause nor the remedy is known. It is not a fungus disease.

Question.— Is spraying necessary for cherries?

Mr. Bogue.— My practice is to spray thoroughly before the buds open, again after the blossoms fall, and if necessary a third time, using both the Bordeaux mixture and the arsenical poison. Also give thorough cultivation.

Question.— How often and when should we dig out the peach-tree borer?

Mr. Woodward.— Dig them in the spring and again in July. An application of skim milk and hydraulic cement at about the consistency of thick whitewash will keep many of them out; dig the dirt away from the trunk and apply for about a foot. Do not use coal tar as it is likely to kill the trees.

Prof. Van Deman.— It is cheaper to dig them twice, as they have not bored as deeply.

Question.— How can we destroy the black lice on cherry trees?

Prof. Van Deman.— Spraying with kerosene emulsion will destroy them, but as they are on the under side of the leaf it is difficult to reach them.

Question.— What is the cause, and what will prevent the peach rot?

Prof. Stewart.— It is a fungus disease that attacks the fruit as it is ripening. The same attacks the plum and cherry. It sometimes affects the foliage, and even the twigs. Remove all the mummied fruit from the tree, as the fungus spores will spread from them. Spray with Bordeaux mixture before the buds open.

Question.— What is the life history, and how can we combat plant lice or aphides?

Prof. Slingerland.— The foliage of shade trees, especially maple, elm and purple beech, has swarmed with plant-lice in many localities. The sweet, sticky liquid which the lice secrete has covered the leaves and dropped on the sidewalks. Young fruit trees, especially apples, quinces, plums, pears and cherries, in nurseries and in orchards, have been so badly infested with lice that growth has been seriously checked and the trees in many cases permanently injured. But the most surprising and destructive work has been wrought by these little pests in many large, bearing apple orchards in western New York. Reports reached us in June that large prospective crops of apples were being ruined by plant-lice. So unusual is it for these insects to appear in sufficient numbers to injure the fruit, that we could hardly believe our eyes when we visited some infested orchards and saw what destruction was being wrought. The young fruits were swarming with lice which had stunted their growth and given them a bunched or knotty appearance, and evidently such fruits were already ruined for first-class market purposes.

Probable causes of unusual outbreak.— We believe that certain weather conditions and a scarcity of their natural enemies have been potent factors in this unusual outbreak of plant-lice. We found but comparatively few of their enemies, like the lady-bird beetles and their grubs, the lace-wing flies and the syrphus flies in the infested orchards. It is possible that the excessive wet season of 1902, or perhaps the recent extreme dry period, may have been unfavorable for the development of these natural enemies and favorable for the plant-lice. We have but little definite knowledge of just what weather conditions cause the "ups and downs" of insect life.

Some life-history notes.— Plant-lice increase with wonderful rapidity, for a single mother louse often gives birth to 100 young, which are born alive, and each one in a week or ten days may get its development and attain to motherhood. Thus the few lice which usually escape the most thorough remedial treatment are often capable of restocking the plant in a few days, so that it is usually necessary to make repeated applications at frequent intervals. Some kinds of plant-lice live on one plant during the winter and early spring, and then migrate to and live on another very different plant during the summer. One of the apple plant-lice does this.

How plant-lice feed.— Many people do not understand that plant-lice feed in a very different manner from a caterpillar or a potato beetle. Plant-lice are not provided with jaws for biting off pieces of a plant, but their mouth-parts are drawn out into thread-like organs which move along a groove in a long slender beak. The threads are forced into the plant and the juices are sucked into the insect's food canal, much as a mosquito works. Therefore, one cannot feed such a sucking insect a poison spray on the surface of a leaf, but it is necessary to hit each plant-louse with something that will cover up its breathing-holes or soak into its body and thus kill by actual contact with the insect. In the case of biting or chewing insects, one has only to aim the poison at the feeding grounds of the insect, but in fighting a sucking insect one must aim at the insect itself.

The kinds of apple plant-lice.— There are three different kinds of plant-lice which commonly infest apples in New York. One is called Fitch's Apple Aphis (*Aphis Fitchii*) and it is this species which appears as green lice on the opening buds early in the season. In a few weeks it leaves the apple tree and lives on the June grasses during the summer, going back to the apple tree in autumn to deposit its winter eggs.

The pinkish lice, often found in apple leaves which they have caused to curl, are the Rosy Apple Aphis (*Aphis sorbi*). They are not usually so numerous as the two green species, and they also migrate from the apple to some other food plant in summer, but later than the preceding species. The species which is now most numerous in infested apple orchards is called the Apple Leaf Aphis (*Aphis pomi*). This green plant-louse, unlike the other two apple aphids, seems to live on the apple trees during the whole year. It usually works on the foliage, curling it badly, and it is probably the one which is the most numerous and destructive in nurseries and young orchards.

We found both the Rosy Aphis and the Apple Leaf Aphis in infested orchards recently, but it is quite probable that Fitch's Aphis was also abundant on the opening buds earlier in the season.

Remedial measures for plant-lice.— The standard insecticides used in fighting plant-lice and other sucking insects are kerosene emulsion, whale oil soap and tobacco decoctions. Western New York orchardists can get good whale oil soap direct from a nearby manufacturer, W. H. Owen, Catawba Island, Ohio, for three cents per pound in 400-pound barrel lots. For apple plant-lice it should be dissolved at the rate of one pound in five or six gallons of water. One nurseryman reports that he finds a sulphur-tobacco soap made by the Larkin Soap Co. of Buffalo very effective. Tobacco stems, to be found in cigar factories, can be steeped or soaked in water (about one pound of tobacco in two gallons of water) and an effective decoction thus made. Kerosene emulsion should be made by the usual formula of one-half pound soap, one gallon of boiling water and two gallons of kerosene, and then diluted with about seven parts of water. Be sure to get a good emulsion by churning or pumping the dissolved soap and kerosene together for several minutes. Doubtless a ten per cent. kerosene emulsion made through a kerosene water pump would also kill the lice.

The effectiveness of any of the above sprays will depend entirely upon the thoroughness of application. *Remember that each louse must be hit with the spray.* Nurserymen often bend over the infested branches and dip them into a pail or pan of the mixture, and this would be the most effective method of treating a recently-set orchard.

One should begin the fight against these lice early in the season. Spray the opening leaves in the spring and kill the stem-mothers, thus stopping the development of future summer generations of the lice.

It would be a disagreeable and rather expensive job to thoroughly treat large, bearing trees with a soap or oil spray, but we believe it would have paid to do so in many orchards. In normal seasons the natural enemies would usually have gotten the upper hand before this, and recent reports from the infested region indicate that the worst is over and the lice are disappearing. Lady-bird beetles are now present in large numbers on many trees, and they are reaping a rich harvest of plant-lice. Thus one will need to use his own judgment whether it will pay to spray bearing trees now. But on young trees we would not hesitate a moment to thoroughly drench the trees and repeat the dose as soon as the lice again appear in considerable numbers.

In one instance a thoroughly cultivated orchard was suffering much less from the plant-lice than a similar orchard just over the fence, which had not been plowed for two years. It is not at all improbable that the destruction of all grasses in the cultivated orchard may have had much influence in preventing the unusual development of the lice.

The usual applications of Bordeaux mixture and Paris green had little or no effect on the numbers of the lice, for the worst infested orchards had been well sprayed with these mixtures. The lice simply could not eat the fungicide or the poison, and not enough was applied to smother them.

Some autumn observations.—Apple growers can get some idea of how numerous these plant-lice are liable to be next season by a careful examination of the bark on the twigs and branches in November or later. All three kinds of apple plant-lice pass the winter as shiny black eggs stuck around the buds and in crevices of the bark. Although the eggs are quite small, one can readily find them as they are usually clustered together and sometimes occur in almost countless numbers. If large numbers of these black eggs can be found on the bark this winter the prospects for a big crop of lice next year will be favorable, but not necessarily certain, for the cold spring rains and their natural enemies may get the upper hand.

ORCHARDS — FERTILIZATION AND CARE.

Question.— Is it advisable to set apple trees at the present time?

Mr. Van Alstyne.— If they are to be set and given no attention; if farm crops are to be grown with them, and they are to be grown with them and not sprayed, better not set them out; but if the trees are fed, pruned and sprayed as they should be, it can be made very profitable.

Mr. Dawley.— New York stands at the head as an apple-producing State, and the man who plants apples to-day has the advantage of a reputation that has been builded by others, and is sure to make money if he properly grows his orchard and cares for it in the future.

Question.— What varieties of apple should be set?

Mr. Bowen.— For commercial purposes I would grow but three kinds, Maiden Blush, Greening and Baldwin.

Prof. Van Deman.— The Ben Davis, mean as it is, is the business apple of to-day. The Baldwin is a sky-bearer and is liable to be affected by the black spot. Sutton's Beauty is a valuable sort.

Mr. Dawley.— Don't plant Ben Davis in New York. We can grow better varieties and make more on them. Let those who have to grow Ben Davis or none, plant that.

Question.— How does cold storage affect fruit growing?

Mr. Van Alstyne.— It encourages it; it preserves the fruit and relieves the market; it also increases the time and territory in which the fruit can be marketed.

Question.— What plan would you follow in setting an apple orchard? What is your method of pruning and cultivation?

Prof. Van Deman.— Set out long-lived standard varieties at least fifty feet apart; fill between with the quick maturing and shorter-lived kinds that will give early returns, and have outlived their productiveness before the other sorts are crowded. Use nothing but apples for fillers; the peach requires different culture and is liable to be injured by the Bordeaux mixture so necessary for the apple. Prune so that the main limb will not leave the trunk at the same place. Shape when small so that you will not have to cut off large limbs later.

Mr. Van Alstyne.— We must spray whether we like it or not. Head the trees low for ease in spraying and picking; there will be less loss from winds.

Question.— Our apple trees blossomed full; the apples formed but fell soon after. What was the cause?

Prof. Van Deman.— Probably a combination of causes. Sometimes a lack of vitality from having over-borne the previous year, or a cold, wet season or fungus disease may have been the cause.

Question.— How far apart should dwarf pear trees be set?

Prof. Van Deman.— As a rule, fifteen feet.

Question.— Which is preferable for a pear orchard, continuous cultivation or occasional seeding.

Prof. Van Deman.— I would seed it to clover occasionally. Do not leave it down more than two years.

Question.— What is the best time to trim fruit trees?

Prof. Van Deman.— The ideal time for trimming apple trees is in the latter part of June. The wounds will heal more readily and there is less growth of suckers. The peach and plum should always be trimmed in the early spring.

Question.—Please name a few early-bearing varieties of apples? Are they advisable for market purposes?

Mr. Willard.— I think it is wise to set a part of the orchard to some of the fall or early winter varieties for the export trade. I should select the Duchess of Oldenburg, the Wealthy and the Hubbardston's None Such; these kinds are free from the fungus diseases.

Mr. Van Alstyne.— I agree with what Mr. Willard has said. I have received more profit from fall apples than from winter varieties; another advantage is that it lengthens the picking season; I believe that a part of the new orchards, say a fourth, should be set to some of the fall varieties; they are valuable for cold storage, as they come upon the market before the winter fruit is ready; I have found them more profitable than the winter varieties; they also lengthen the gathering season, which, with the scarcity of farm labor, is an important item.

Question.—Are the Yellow Transparent, Wagner and Boiken apples good commercial varieties? Are they liable to fungus attacks?

Mr. Willard.— I should not recommend the Yellow Transparent for a market apple in this section, although a few should be grown for home use. The Wagner and Boiken are excellent; they are very hardy, and the foliage is so perfect that there is no need of spraying them except for the codling moth.

Mr. Day.— I cannot speak too highly of the Boiken. It has a very healthy foliage which is practically free from fungus diseases. For eight years it has never failed to produce a crop. One of its good points is its keeping quality; in March and April it is at its best; it is an early bearer and the fruit sets uniformly all over the tree; its quality is not as high as some, but for culinary purposes it is excellent.

Question.— What is the best cover crop for an orchard?

Mr. Udell.— I have only grown the clover crop for two years, and cannot say which is best. We have grown a variety. Crimson clover, cow peas, cow-horn turnip, buckwheat and alfalfa have all done well; the mammoth clover has perhaps done as well as any. Cultivate the orchard till the first of July and then sow your clover.

Prof. Beach.— We have used the mammoth clover with good results. On the heavier soils we use cow peas and a little buckwheat.

Mr. Dawley.— I have used sweet clover for ten years. It is the ideal cover crop when it does well.

Question.— What is Mr. Hitching's method of handling his orchard?

Answer.— He sets the trees in the sod and mows the grass twice a year, and rakes it around the trees to serve as a mulch; this holds the moisture and allows the apples to fall with little injury; there is also less labor required. I do not believe it advisable for this section, as Mr. Hitchings has ideal conditions for this method. When the trees are older he will probably have to haul in material for a mulch, and if he should be obliged to change to the plan of cultivation he will be very likely to injure his trees by cutting off the feeding roots.

Mr. Van Alstyne.— I would like to add a word of caution to what has been said. I believe that great harm is being done by the wide circulation of Mr. Hitchings' method, as so many people want an easy way of salvation, and will adopt this plan without either his conditions or his perseverance.

Question.— Will Mr. Willard state how he cares for his orchard. Whether he cultivates it or keeps it in sod?

Mr. Willard.— My views have recently changed somewhat; I am now inclined to think that I have better results on sod. The fruit is of a higher color and it keeps better. Others in our section have had similar experiences, but it might not be as satisfactory here. We use no potash, as we think we have an abundance in our soils; we use the South Carolina rock, and a limited amount of stable manure.

Question.— What commercial fertilizer is best for an apple orchard on heavy soil?

Mr. Van Alstyne.— I have come to the conclusion that on most of the apple orchards of this State, on both heavy and light soils, the use of phosphoric acid gives the best results. I formerly advocated the use of potash, but I now feel that our soils contain this element in abundance.

Prof. Beach.— I would not want to give this as a universal rule, although on our heavy soils at the experiment station the phosphoric acid has been very effective. Try the potash in a small way and note the effects.

Question.— If apples head low, limbs nearly meet and obstruct the passage of a steam sprayer, would it injure the trees to shorten the limbs? Does cutting the ends of the limbs injure the trees?

Prof. Bailey.— The limbs should be cut off at their juncture with another limb or they will not be likely to heal over. Possibly the trees are so near together that every alternate one should be taken out.

Question.— In planting an apple orchard of five or six acres, what varieties would you recommend? Is it advisable to use fillers? Soil good sandy loam.

Mr. Van Alstyne.— I would not set fillers; I do not believe in the principle; the invariable tendency is to leave them so long as to injure the permanent orchard. The varieties to be set should be governed largely by the locality; in western New York the Baldwin and Greening seem to do well. I would set the Duchess of Oldenberg, Wealthy and Maiden's Blush; these command a good price; they may be profitably put in cold storage to sell just before the winter fruit is ready, and in growing them we lengthen the picking, which, when farm help is scarce, is an important factor. The Hubbardston is not good for cold storage, as with its large water content it shrinks too much.

Question.— Can we propagate apples from scions set in the ground as we do currants or grapes?

Prof. Beach.— It is not advisable in this section, although in Texas and some of the drier States it has been done to some extent.

Question.— Is the grafting of grapevines practicable?

Prof. Bailey.— It is, provided it is done before or after the bleeding period. The best results will be had when the graft is made below the surface and the soil packed around to keep it in place.

Question.— What varieties of plums would you advise for commercial purposes?

Mr. Willard.— Either the very early or the very late. The Reine Claude is an excellent kind, and there is a constantly increasing demand for Damsons.

Question.— Is it advisable to set the Rome Beauty and Sutton Beauty apples?

Prof. Beach.— The Rome Beauty and Sutton Beauty apples are comparatively new varieties, but are well worth trying.

Question.— What is the best time to set out an orchard?

Mr. Gott.— Set it in the fall, as the trees are then nearly dormant and will take root much quicker in the spring.

Question.— What would become of our fruit if we should have a full crop in one year?

Mr. Van Alstyne.— I should not worry about it, as such years are very infrequent. The markets are constantly increasing as are also the facilities for distributing the product.

Question.— Does underdraining have anything to do with the coloring of apples?

Prof. Beach.— Color depends upon several things; the amount of fruit in the tree affects it; if thinned the fruit will be of a higher color; in a sod orchard the color is better than where cultivated; the amount of sunlight is another factor; on some soils the addition of potash will affect the color.

Question.— Should we topdress our orchards with manure or plow it under in the spring?

Mr. Van Alstyne.— No ironclad rule can be laid down. If applied in the fall, or early winter, I should prefer to plow it under shallow; if piled in the orchard it is liable to heat and the spot under the pile will get an undue amount.

Question.— What can be put on small fruit trees to prevent the mice from gnawing them?

Mr. Norris.— Wrap them in the fall with a double thickness of tarred paper, removing it in the spring.

Question.— Does potash give apples a higher color?

Mr. Van Alstyne.— It may and it may not; the tendency will be to make them of a higher color.

Question.— Is there any way to induce, or, if necessary, compel a person to remove the black knot from his fruit trees?

Prof. Beach.—Address the Commissioner of Agriculture for advice on this matter.

Mr. Rice.—A copy of the Agricultural Laws, which may be had of the Commissioner, will give you much useful information.

Question.— How can the fruit grower be compelled or persuaded to be honest in packing his fruit?

Mr. Van Alstyne.— There are two ways: The narrow one is to make him see that it will be money in his pocket to do so; the other and better way is to so work upon his conscience as to make him see that it is the only right way to do.

Mr. Tice.— Some of us in Oswego county have been very particular to pack our fruit in this way, and the others are now finding themselves obliged to adopt the same method.

Question.— What are the most profitable plums for us to raise?

Mr. Wood.— I should choose the Reine Claude, the Burbank, Monarch and the prunes.

Mr. Van Alstyne.— It is my advice to grow those varieties that do the best in your section, as it is very largely a local matter.

Question.— Is there a better sour cherry than the Montmorency?

Mr. Young.— The Montmorency is our favorite. The Morello is more affected with the maggot.

Question.— What are the best varieties of peaches to plant?

Mr. Wadhams.— I shall set next spring the Niagaras, the Yellow St. John, and a few of the Fitzgerald. The Elberta I have discarded. The canners are after the St. John, and we will soon have to look to them to take our surplus.

Captain Allen.— I believe the Early Crawford is the best for this section; it hangs well to the tree and is always in demand. On my gravel soil the Late Crawford does well.

Mr. Nellis.— I should set the Early Crawford. The white peaches do not sell as well.

Mr. Willard.— For home use I should select the Horton Rivers, Hynds' Surprise and Hill's Chili. The two former are very hardy, but the fruit is somewhat inclined to rot. The last is not a good market peach, but for canning it is unsurpassed.

Question.— How shall we prune the peach orchard?

Prof. Bailey.— First cut off the sprouts around the base; then take out the weak, dead stuff from the center; then thin out as much as necessary, and if the tree is making a very vigorous growth head it back.

Question.— When is the best time to cut back peach trees?

Prof. Bailey.— Late in March or early in April is the best time, although we are doing it now to avoid the rush of work later in the season. If you can wait till later you can be governed by the amount of wood that has been killed by the frost.

Question.— Is a peach tree any better or will it live any longer if budded on plum stock?

Prof. Beach.— It might, on soils that were better adapted to the plum, but I believe it would be just as susceptible to the peach diseases as if grown on its own stock.

Question.— Will it do to set peach trees on a blue clay soil and on the north slope of a hill?

Prof. Bailey.— You can hardly expect the best results on such soil.

Question.— What is the best kind of pear to set for profit, and how far apart should they be set?

A Farmer.— The Bartlett is the best for use, and it is wanted by the canneries.

Mr. Van Alstyne.— The Kieffer can be grown more readily, and with us it commands a good price. I would set them from eighteen to twenty-one feet apart.

Question.—Are Chairs' Choice and Fitzgerald good peaches for commercial purposes?

Prof. Van Deman.— Yes; very good. The Elberta is an excellent variety.

Question.— Will dwarf apples do well on a steep hillside, and will mulching take the place of tillage?

Prof. Van Deman.— They may pay, but for practical purposes I would not advise them. Mulching is all right if we have enough of it.

Question.— How about heading in young peach trees?

Mr. Van Alstyne.— I am a great believer in heading in; I would cut back the young tree to four or five short branches. The second year cut off the entire top and start the tree from the trunk; this makes it stocky and low down, where it can be sprayed better, the fruit can be thinned more readily and can nearly all be picked from the ground. Each year it should be cut back, more or less, according to its condition. This treatment tends to produce fruit buds. I would cut back a bearing tree from one-third to one-half each year.

Question.— What principles would you follow in trimming peach trees?

Mr. Wadhams.— We advocate close pruning, and the results are good. We cut back the first year's growth to six buds. From this time till the treee is in bearing cut back from one-half to two-thirds according to the growth made. This forms a low, stocky tree not liable to break down and from which the fruit may be readily gathered.

Question.— How far apart should blackberries be set?

Mr. Rice.— The rows should never be less than eight feet apart; this gives room to work between them with a team. Set them three feet apart in the row; clip the canes when about five feet high and allow the laterals to form; these should be left till all danger of frost is passed in the spring; then cut them back, leaving them a foot long at the base of the cane and decreasing the length, leaving only two or three buds on the upper laterals. We grow the Minnewaska, but it is too tender for Washington county. The Snyder is much hardier.

Question.— Is it advisable to cut back the tips of dewberries after fruiting?

Mr. Spencer.— I prefer to wait till spring and see how badly they have been hurt by the frost.

Question.— What are the three best varieties of strawberries for size, flavor and profit?

This was conceded to be a difficult question to answer as the strawberries vary so in different localities. Several spoke well of the Brandywine and the Marshall. Mr. Van Alstyne said the Senator Dunlap was quite generally liked.

Question.— What are the relative merits of the Brandywine and Hunn strawberries?

Mr. Clark.— The Brandywine is one of the most valuable sorts, both for home use and for market; the foliage is very thrifty and not subject to blight; the fruit is large, of a high color and fine flavor. While the Hunn may be valuable in some localities, as a rule it is quite subject to the blight; if tried at all it should be in a small way at first.

Question.— What is the cause of strawberries bearing a second crop in the fall?

Mr. Van Alstyne.— It is probably due to the increased growth caused by the unusual weather conditions.

Mr. Collingwood.— Some varieties are more liable to fruit the second time than others.

Question.— Is the Rough Rider strawberry a desirable variety?

Mr. Mills.— It is one of the kinds that has been sold more by advertising than from its merits.

Mr. Tice.—I am not competent to advise as I have never fruited it. My observation of it has not impressed me favorably.

Question.— What is the best time to plant strawberries?

Mr. Clark.— Set them as early in the spring as the land can be properly prepared.

Question.— What varieties of strawberry does Mr. Tice grow?

Mr. Tice.— We are now growing but three kinds, the Marshall, Clyde and Atlantic; these require great care, but if properly grown are the best fancy berries.

Question.— What is the best commercial fertilizer for strawberries?

Mr. Rice.— It will depend on the condition of the soil and its previous treatment. If it has had plenty of stable manure probably no nitrogen is needed. The potash may be applied in the form of wood ashes, and the phosphoric acid in South Carolina rock. If stable manure has not been used apply a complete fertilizer.

Question.— Is salt beneficial to fruit trees, to berries and other small fruits?

Prof. Bailey.— It has no direct fertilizing value, although it may help indirectly by holding moisture or by unlocking some of the potash.

Question.— Which is preferable, top grafting or budding?

Prof. Beach.— I have observed but little difference. There is more of a shock to the tree in grafting, but if the tree is kept in a healthy, growing condition it will heal rapidly.

Question.— Is it or is it not a good plan to graft trees over once in ten or fifteen years?

Prof. Bailey.— There is nothing to be gained unless you wish to change the variety.

Question.— What is the best fertilizer to use to give fruit a good color in the autumn?

Prof. Beach.— If the orchard is in good condition potash will be most likely to, particularly on the lighter soils.

Question.— At what time should apples be picked to conserve both flavor and keeping quality?

Mr. Willard.— Our experience at the Pan-American Exposition has shown that those picked before fully ripe keep much better, but what was gained in keeping quality was lost in flavor.

Question.— What is the best material to be used in mulching an orchard?

Mr. Van Alstyne.— The material used is not as important as the amount.

Question.— How should the soil be prepared for setting an orchard?

A Farmer.— The soil should be as thoroughly prepared as for a grain crop. Another essential is to dig a large hole so that the roots may be set in a natural position. The dirt should be packed very firmly about the roots.

Mr. Willard.— You should avoid the danger of setting them too deep.

Question.— How should cherry trees be pruned?

Mr. Willard.— I do not believe in pruning them extensively; simply take out the interlocking branches.

Question.— Is it advisable to grow rape in the orchard?

Mr. Van Dreser.— It will do well in an orchard, and it is an excellent food for chickens, pigs or sheep; it should not be fed to cows that give milk, as it will be apt to taint it; the most desirable variety is the Dwarf Essex.

Question.— Will Mr. Tice tell us something of the methods of Oswego county strawberry growers?

Mr. Tice.—A common mistake is to get the land too rich; this will cause an excess of foliage at the expense of the fruit. Stable manure should be applied to previous crops and depend upon commercial fertilizers for the strawberries. The land should be well drained, yet naturally moist; the land should be well plowed and thoroughly fitted; get your plants from near home, if possible; such varieties are more likely to do well in your section; strawberries vary greatly with the locality; buy more plants than you need and sort out any that are inferior; cut off all dead leaves and runners, and shorten the roots to about four inches. There are three essentials to setting plants successfully; one is that the roots be spread out; another is that the crown be set level with the ground, and the third is to press the soil very firmly about the roots; the surface soil should then be stirred lightly to check evaporation. The after care of the strawberries may be summed up in two words: shallow cultivation. The feeding roots run near the surface and should never be destroyed; it is better that the earlier runners be allowed to set. They will make stronger plants than if not allowed to set until later. We plant two and one-half feet each way and cultivate both ways until the runners are ready to set, after this we go one way only. About September first we sow in barley at the rate of two bushels per acre; this checks the growth of the runners and keeps the weeds in check. After the leaves have fallen we mulch them heavily with straw or swale hay; avoid straw that may contain timothy seed; in the spring loosen up the mulch and remove a part of it if it is too heavy.

Question.— How should we treat our orchards to get the greatest returns?

Mr. Van Alstyne.— The first essential is fertility. The well-nourished tree will not only be more productive, but it will be less infected by disease and better able to withstand the attacks of insects. Unless the growth is already very rank and vigorous, stable manure may be freely applied; if it fails to respond, or you have no stable manure, use some commercial fertilizers. I believe that in most cases the application of phosphoric acid will be found the most satisfactory, as our soils as a rule have an abundance of potash already in them.

Next to fertility comes care. There is no question that the young orchard should be under cultivation, at least until it comes into bearing; but the orchard should be put first, and those crops grown that will be best for it. I would never grow the grain crops, as they take such a large amount of water from the soil, but would raise those that require cultivation early in the season and will shade the ground later. After the trees have come into bearing there are two methods that may be followed: The cultivation may be continued, in which case the ground should be plowed early before the feeding roots start and the ground thoroughly stirred through the season to check the evaporation. Later, cover-crops should be sown to be plowed under the next spring. The other method, which is the one I have followed for many years, is to seed the orchard down to a variety of pasture grasses and fill it with young stock in such numbers as to require supplementary feeding. There are three points in favor of this plan: It is inexpensive, requiring comparatively little labor; the orchard is fertilized uniformly by the droppings of the animals, and the worm-infested fruit that falls is eaten. You should remember that the animals are not there to be fed from the orchard as much as they are there to feed the orchard.

The third essential is spraying. Buyers are now discriminating in favor of the sprayed orchards. Spraying should be done thoroughly or not at all. I do not favor the March spraying that some advocate, as it makes an extra application and does not pay for the extra labor. I would spray first as the buds began to swell, and a second time after the blossoms fall. Two thorough sprayings are preferable to a half dozen improperly done.

Question.— Can you say a good word for the Ben Davis apple?

Mr. Van Alstyne.— I can say several if the apples are as good as the sample before me. There are many things in its favor; it is a rapid grower, free from fungus and an early and annual bearer; it also commands a good price in market, ranking in price but not in quality with the Greening.

Mr. Rice.— The Ben Davis has unquestionably been profitable, and is at the present time, but I do not believe that it will be in the future as it lacks that fine quality which should be our trade mark. You cannot expect to fool the apple-eating people all the time.

Question.— How is the Ben Davis stock for top-grafting?

Prof. Beach.— It does not seem to be congenial.

Question.— What would you do with a Duchess pear orchard ten years old that blossomed freely but did not set fruit?

Prof. Beach.— It is probably in too growthy a condition. I would recommend a rather severe pruning.

Question.— What is the object in using fillers in the orchard?

Mr. Rice.— To profitably occupy the ground and do away with the temptation to grow other crops.

Question.—Are sheep and hogs a benefit to the orchard?

Mr. Wood.— Hogs are good, but sheep are apt to browse the twigs if the trees are headed low, as they should be.

Question.—Are cow peas a good crop for the orchard?

Prof. Van Deman.— There is nothing better; sow about July first, in rows; cultivate once or twice and later turn in sheep or hogs; it makes an excellent food for such stock.

Question.— What is the proper amount of seed and the best method of sowing cow peas for fertilizer in an orchard?

Mr. Rice.— I should put them in drills two and one-half to three feet apart, having the seeds about six inches apart in the row; this is preferable to broadcasting.

Question.— Where cow peas are sown in an orchard for a fertilizer, will they produce as good results when fed off by sheep as when plowed under?

Prof. Van Deman.— No, as a considerable part of the fertility is taken out by the sheep. If it were all returned there would still be a loss in the humus.

Question.— What is the value of the moth-catcher?

Mr. Van Alstyne.— While it catches many insects it does not catch many of the codling moth. It is better to spray thoroughly and destroy both insects and the fungus diseases also.

Question.— How would you topgraft trees?

Prof. Van Deman.— Graft first the leading limbs, but do not cut large ones; better to go higher up; make a sloping cut and only put in one scion; this will heal more readily than the square cut. For grafting wax use one part of tallow, two of beeswax and four of resin; pour into water, and when cool work like molasses candy, form it into balls, wrap in oil paper and keep till wanted.

Question.—Is it advisable to set cherry trees; if so, what kinds?

Mr. Bowen.— I believe that this section is peculiarly adapted to growing the cherry; the sour cherry is in greatest demand.

Question.— When is the best time to graft cherries?

Prof. Van Deman.— Very early in the spring, or else very late. In the latter case the scions must be kept upon ice, that they may be perfectly dormant. Never put but one scion in any stock.

Question.— Can apricots be grown in Wyoming county?

Prof. Van Deman.— They can, with care; the trees must be jarred occasionally to shake off the curculio.

Question.— Will grapevines properly trimmed bear so heavily as to injure next year's crop?

Mr. Woodward.— They may; it depends largely upon the variety. The Delaware is quite apt to overbear; the Niagara is a very rampant grower. Stable manure or other nitrogenous fertilizers are apt to cause an excess of wood.

Question.— How far apart should dwarf pear trees be set?

Prof. Van Deman.— As a rule, fifteen feet.

Question.— Which is preferable for a pear orchard, continuous cultivation or occasional seeding?

Prof. Van Deman.— I would seed it to clover occasionally. Do not leave it down more than two years.

Question.— What is the best variety of red raspberries, and their proper treatment?

Mr. Rice.— We like the Marlboro, as it is extra early and so commands a higher price; they are good yielders and are a better color than the Cuthbert, but not as vigorous growers. For a late variety there is none better than the Cuthbert; set them in rows four or five feet apart and three feet apart in the row; cut the cane back before planting and pack the earth very firmly around them; grow them in narrow rows for ease of cultivation, and remove and burn all old canes after the bearing season, heading the new canes back slightly if they have a rank growth.

Question.— Is it best to remove the old crowns from a strawberry bed the second year and depend upon runners to form the hills for the next crop?

Prof. Van Deman.— It depends upon the conditions. Many growers find they have better results by plowing up the bed after it has borne its first crop and setting a new bed rather than cleaning out the old one.

Mr. Tice.— It depends upon the conditions and the variety. If it is in narrow rows and not heavy bearers you can clean it out and get nearly or quite as many the second year; otherwise I would plow it up.

Question.— How shall we destroy the worms and lice on the currant bushes?

Mr. Woodward.— For the worms an application of white hellebore; for the lice spray with kerosene emulsion.

Question.— When should scions be cut for grafting, and how should grafting wax be made?

Prof. Van Deman.— Scions may be cut at any time when the wood is not frozen, but preferably in the late fall or early winter; they should be kept in a cold place until just before grafting; cut them from the leading branches of the best bearing trees; graft the leading limbs first, taking several years if the tree is large; graft nothing over two inches in diameter; set the scion at least six inches from a fork, making a sloping rather than a square cut, and putting in but one scion. Grafting wax is made by melting together one part of tallow, two parts of beeswax and four of resin; pour into water, when cool work like taffy, form into balls, wrap in greased paper and lay aside till wanted. It will keep indefinitely.

Question.—At what time of year is it best to trim fruit trees?

Mr. Rice.—As a rule, at any time after the foliage is off. About this time of year will be as good as any. Pruned now, the wounds heal very rapidly, beginning as soon as the buds open. Do not wait five or six years and then go into the orchard and cut out a winter's supply of firewood. Prune a little every year, and then burn the brush, but don't make the mistake of cutting off all the fruit spurs, thus leaving the limbs of the trees naked nearly to their tops.

Question.— How many varieties of prunes are there? Which is most desirable?

Mr. Rice.— There are a number of varieties of the prune family of plums. We have had at least a dozen varieties. There is one known as "Fellenburg," that is, doubtless, best of them all. If you are going to order "German prunes," be careful to have your nurseryman state which variety he has sent; patronize some well-known, responsible nurseryman.

Question.— Is a sandy soil, having a sandy, gravelly subsoil, a good one on which to plant an apple orchard?

Mr. Smith.— I have seen orchards grown on that kind of soil that were good; but, as a rule, the best orchards are on clay or loam soils. Sandy soils ought generally to be well fertilized; but the quality of the apple is not, usually, as fine as in apples grown in some other soils.

Question.— Does it pay to thin fruit?

Prof. Van Deman.— It certainly does; the quality will be much finer. Another argument in its favor is that more phosphoric acid than potash is required to perfect the seed of the fruit than the flesh which surrounds it.

Question.— How far apart should apple trees be set?

Prof. Van Deman.— In setting an orchard, plant the trees from forty to fifty feet apart. Between these set fillers of some earlier maturing sort that will give fruit for a number of years before they will ever crowd; when they do crowd they should be removed. The Wagner and Wealthy are good varieties for fillers.

Question.— Why are so many orchards unproductive?

Prof. Van Deman.— One of the chief reasons is overcrowding. Many orchards have been set twenty-five or thirty feet apart. Long before the branches meet the roots are interlaced. The tree needs plenty of room in the air and sunlight, as well as in the ground, to enable it to perfect its foliage.

MISCELLANEOUS.

Question.— Does it benefit land to let it lie idle and grow up to weeds?

Mr. Rice.— Yes; this is nature's way, but it is a very slow way. The weed roots are many times feeding below where those of cultivated plants will get their nourishment; they are also acting upon the mineral matter locked up in the soil, breaking it down gradually and making it available. As nothing is taken off, this all goes back to the soil, adding the mineral matter and also much humus. But this is not generally a wise plan. The better way is to plow and harrow the land, setting free plant food by this means; then sow some crop that is particularly a nitrogen gatherer, such as the clover or cow peas.

Question.— Which would you advise sowing, grass seed with buckwheat, or wait until the buckwheat has been removed, harrowing the ground immediately and then seeding?

Mr. Rice.— It depends upon the condition of the soil. If it is very rich and the buckwheat is sown thickly it will be apt to smother the young grass; where it is sown thinly the results are very good. I would not sow after buckwheat, as it will be too late for good results. We wish to sow by the middle of August, that the plants may get a good start before winter.

Question.— What is the proposed plan for free tuition of country pupils in high schools?

Mr. Witter.— The Governor has recommended that the tuition of non-resident children doing academic or high school work shall be paid by the State.

Question.—At what time should oats be cut to secure the greatest feeding value of both straw and grain?

Mr. Witter.— Oats require a very large amount of water, particularly in the last few days of their growth. If they are cut when the lower joint is dry and the heads partly ripe you will get better straw and heavier grain than if left to ripen more completely.

Question.— What will kill the snails on the ginseng plants without injuring either the plants or the seed?

Prof. Sirrine.— I have had no experience with ginseng, but for the snails that infest some flowers the florists use Paris green upon pieces of potato or bread where the snails will eat it.

Question.— Can ginseng be profitably grown for commercial purposes?

Mr. Goodspeed.— This plant, the roots of which are highly esteemed in China, for their supposed medicinal qualities, is being grown to some extent in this country. It is difficult to cultivate, as it requires shade. The present supply cannot meet the demand. The price is much higher than formerly, as the roots of the wild plant are nearly exhausted, and the cultivated article is not yet being dug to any great extent.

Question.— Is there any law permitting the employment of prisoners in road work?

Mr. Witter.— There is, and in our county it has worked very satisfactorily; one result has been a great decrease in the number of tramps. The county buys the stone and these are broken during the winter months; in the summer they are employed in draining and repairing the highways.

Question.— What can we do to get rid of the hedges that cause the snow to drift our roads so badly?

Mr. Van Alstyne.— I know of no way except to create a public sentiment against them. The osage orange hedge is a great breeding place for the San José scale.

Question.— What is the matter with land that grows an excess of vines or wood, and does not produce fruit in proportion?

Prof. Bailey.— I should think that it was caused by an excess of nitrogen in the soil. I would withhold stable manure from the field for a time.

Question.— What are "Mother's Clubs" doing among the farmer's wives?

Mrs. Wells.— This work was started in the cities, but the farmers' institutes and the State grange having recognized its value for the farmers' wives, have published a series of leaflets covering the work, which are furnished to any grange that applies and to other organizations at a small expense.

Question.— In plowing under green crops, should they be allowed to mature or be plowed under the ground?

Prof. Bailey.— I would not let them mature, as I prefer to get the land worked early in the spring to check the evaporation. As between fall and spring plowing, I prefer the former. I do not think there is much loss unless the land slopes so much as to cause it to wash.

Question.— What is best to plow under to improve the soil, green corn, buckwheat or rye?

Mr. Cook.— There is no grain so valuable for green manuring as buckwheat; it leaves the soil in fine condition.

Question.— Can corn and cow peas be grown together with advantage?

Mr. Van Alstyne.— They are, to quite an extent, in Delaware and the States a little to the south of us, but here I believe that we will get better results by growing them separately and putting them in the silo together. We have never been able to grow peas enough to balance the silage, but I believe that we should work along this line.

Question.— Do you not think that our having so many factories where young men get good wages, causing many of them to leave the farms, has much to do with the prices of farm land in the east?

Mr. Witter.— We should take a broad view of this subject. The factories are necessary and they make a good market for our farm products. One thing that draws the boys to the cities is the more regular hours of labor, and some of our best dairymen recognize this and make it their practice, except in extreme cases, to have the entire day's work done at six o'clock. Another factor in farm prices has been the competition from the West, made possible by the increased facilities for transportation. A ton of hay from the West is carried to New York as cheaply as from St. Lawrence county, and other products in proportion. I feel that education along the lines of agriculture will do much to keep the young men on the farm.

Question.— What is the cause of beet blight?

Prof. Sirrine.— From the description, I should think it was a scald caused by unusual weather conditions. When anything unusual is noticed in your growing crops write to either the experiment station at Geneva or Ithaca for information.

Question.—Please give your opinion of the "cold water paints," as to economy and durability?

Answer.— They have proven satisfactory.

Question.—How can farm life be made more enjoyable socially?

Mrs. Wells.— The grange is the great social factor in farm life. The ladies should also have societies of their own; either the mother's clubs or some similar organization where they may meet from time to time. The great lack in the country life is sociability.

Question.— Will it pay to use the weeder on young oats or beans?

Mr. Van Alstyne.— It may be used with profit on oats, both before and after they are up. Roll the oats down after sowing and then run the weeder over them to mellow the surface and check evaporation. I should be afraid the young beans would be injured.

A Farmer.— I have used it on beans with no bad results, but would do it in the afternoon when the beans had dried off and were less tender than in the early morning.

Question.— Is the feeding value of rape injured by frost?

Mr. Van Alstyne.— Undoubtedly it is, the same as corn would be, but I have never seen any bad effects from feeding it gradually where the stock were accustomed to it.

Question.— What is the best forage crop for cows for Orleans county?

A wide range of opinion was shown on this. Clover was recommended, but was hardly thought to be early enough for forage. Peas and oats were favored by a number. Rye, if cut early, was considered valuable. Cabbage was thought to be too late to be classed as a forage crop, but could be fed in moderation to good advantage.

Question.— What condition of soil is indicated by the growth of mullein and sorrel? Do they indicate an acid condition?

Mr. Woodward.— The growth of mullein has been said to indicate an abundance of potash. Sorrel will grow on a sour soil and will also grow on soil that is lacking in humus. It is not so noticeable on rich ground as the addition of the stable manure tends to correct any acidity that there may be.

Question.— How do you sow turnips in corn at its last cultivation?

Mr. Van Alstyne.— We sow them broadcast just before cultivation, using one-half pound of seed with about two quarts of clover. In very tall corn they may be sown from horseback, but ordinarily it is not necessary. Turnips plowed under before sowing wheat are valuable for the reasons heretofore referred to; that is, they have the power of using those elements of fertility that plants of a higher order cannot. They are stored up in both the root and the top, and when these decay this plant food is left in an available form for the ordinary farm crop.

Question.— Why is it better to plow clay ground in the fall?

Mr. Cook.— In that the frost may break it down, set free some plant food and leave the soil in better shape for the next crop.

Question.— Does the frequent hoeing and cultivating of the crop make the soil moist or keep it moist?

Mr. Cook.— The constant working of the soil tends to break up and separate the surface particles, and thus prevent the water being drawn to the surface and evaporated.

Question.— Should we cultivate to kill the weeds or is there some more important reason?

Mr. Van Dreser.— There are two reasons equally important: to conserve the moisture and to kill the weeds.

Question.— How do our farmers compare as men with their fathers?

Mr. Van Alstyne.— I think they are broader and better men, otherwise they are not doing justice to their father's memory. They are taking in more money, although they may not be so well to do. Our wants have multiplied and the conditions of life then would not be satisfactory now.

Mr. Cook.— I am inclined to think that the young men of to-day are too anxious to begin where their fathers left off. I do not think as many young men are paying for their farms now as years ago.

Mr. Van Alstyne.— I think an explanation of this may be that many have purchased at the prevalent high prices, and also at the higher rates of interest, and are handicapped by the fact. I believe that there was never a better time than the present to buy a farm, as they seem to have reached the lowest point and already there is an upward tendency.

Question.— Can you tell us how to cleanse maple syrup?

Mr. McEwen.— Our method is to strain both sap and syrup several times. We use no preparation.

Mr. Shepard.— The question may refer to the nitre or "sugar sand," as it is sometimes known. This may be removed by boiling it to the standard of eleven pounds to the gallon, and allowing it to stand; this matter will then settle.

Question.— How shall we spend our winter evenings at home?

Prof. Harding.— One very profitable way is in using the Farmers' Reading Course. In this way we may learn much that is both interesting and profitable.

Question.— What roofing would you use on a good barn or house when shingles are $2.75 a thousand?

Mr. Van Wagenen.— This is a bottom price for shingles, and there are few sections of the State where they can be had for this price. I believe that the day of shingled roofs is passing away; the quality is constantly getting poorer and the price higher; the slate roof is what we must come to; the objection to an iron roof is that it is so apt to rust; the slate roof has everything in its favor, and little can be said against it; it is heavy, but the snow will not stay upon it and make a great additional weight, as in the case of the shingles; the price is a little higher, but it will last indefinitely.

Question.— Which is the better, three-ply felt roofing or shingles?

Mr. Cook.— I do not favor the felt. An iron roof will last fairly well if it is painted on the under side before it is laid and the upper surface kept painted; otherwise it will soon rust out.

Question.— Is it a good plan to pasture your meadows?

Mr. Wood.— It is a very poor practice.

Mr. Fuller.— I do not think so, as a rule. If there is a very heavy aftergrowth a part of it may be fed off.

Question.— What are the requisites for establishing a rural free delivery route?

Mr. Giles.— Write the Fourth Assistant Postmaster-General for directions. A route must have at least sixty families to be served, and must be covered in from twenty to twenty-five miles. Get up a petition, signed by most of the residents on the route; send this to your congressman, and if he approves an inspector will be sent to look over the route; if he favors it it will be supplied in its order.

Mr. Witter.— I believe that the free delivery system will soon become general. Many who formerly opposed it are now most heartily in favor of it. The rule now in force on some routes should become general — that is to reverse the order of traveling the route each alternate week.

Question.— Is not a co-operateive telephone company cheaper and more desirable for the farmer than renting from a stock company?

Mr. Rice.— It does not matter so much so long as they are run on a good business basis. If several small companies are formed, which afterward join their lines, there is apt to be a difference in instruments, in wire and equipment that renders an interchange less satisfactory. The better way is to call a meeting of those interested, organize under the State law, elect a director from each section interested and select some capable person to have the charge of building the line. If it is simply a co-operative company each individual may be held responsible for any damages that occur; otherwise each individual is liable only for the stock that he holds.

Question.— Do the bean growers of the western part of the State put in wheat after beans without replowing the ground, and what is their method?

Mr. Gott.— It is a common practice in that section, and if the field has been kept clean it can readily be done. The ideal condition for wheat is a thoroughly compacted soil with a very fine surface soil. The disc harrow will put a clean field in fine condition.

Question.— Why is it that when our sons receive a college education that they have no desire to engage in farming? Is the higher education detrimental to farm interests?

Mr. Van Alstyne.— I do not think that the facts bear out that statement, as I have known of many young men who have taken the agricultural course who have been glad to go back to the farms. Professor Bailey remarked the other day that young men who had taken the four-years' course in agriculture were in such demand as superintendents or other advanced positions in agriculture, where they could command higher compensation, that they did not go back to the old farm although still engaged in agriculture.

Question.— Are copper sulphate and blue vitriol the same? What is the wholesale price, and where can it be obtained?

Mr. Tice.— They are the same and can be had at any wholesale druggist's, and can be bought for about six cents a pound.

Question.— Please state why a farmer does not need a surplus of money to admit the principles of up-to-date dairying?

Mr. Cook.— A surplus of money is very convenient, but few farmers are troubled with it. The first thing for a farmer to do to increase the efficiency of his herd is a pure bred sire from some good milking strain. The second is to have a knowledge of the soil and the principles that govern plant life. These require but a small outlay of money, and with them the dairy farmer is on the way toward the top of his profession.

Question.— In what proportion would you mix peas and oats for sowing?

Mr. Cook.— We should sow as many peas as the oats will hold up; this depends upon the soil; from one-half to a bushel of peas and two bushels or a little more of oats to the acre.

Question.— What is the best method of killing quack?

Mr. Van Dreser.— Plow in the fall and again in the spring; put in fine condition and sow thickly to buckwheat. This will make a quick growth and smother the quack. We have killed it completely in one year by this method.

A Farmer.— Pasturing will kill it.

Another Farmer.— Thorough cultivation with corn or potatoes for two years.

Question.— Will it pay to warm water for stock?

Mr. Van Wagenen.— I am not inclined to think so, although the experiments made have not been as conclusive as we would suppose.

Question.— Does thorough cultivation enrich the soil?

Mr. Cook.— In one way it does. That is it makes available some of the locked up fertility that is in the soil.

Question.—How can we keep the boys and girls home evenings?

Mr. Van Alstyne.— Make the home so pleasant that they will not want to go away.

Question.— How much water is required to grow a hill of potatoes or corn?

Prof. Cavanaugh.— This subject was gone into quite extensively at the experiment station some time ago. It was found that each pound of dry matter required the evaporation through the plant of three hundred pounds of water. This varies somewhat in different plants. Oats need more than any other farm crop that has been tested.

Question.— What is the Farmers' Reading Course?

Mr. Witter.— This has been carried on for the past three years. The aim is to help those who cannot have a university course; the reading matter is sent out by Cornell university; the first year's reading is upon the soil, the second upon feeding the plant to the animal and the third upon the orchard; these are sent free to all who apply. There are also courses for farmers' wives and children.

Question.— What do you know of Assemblyman Plank's "County Agricultural School" bill? Is it a desirable thing?

Mr. Giles.— It is a bill making it permissible to establish in each county an agricultural school. It shall be in charge of the

Department of Agriculture and its instructors shall be members of the institute force, or some other well-qualified persons; the sessions to last three or four weeks; the line of work to be similar to that of our institutes, but more complete than it is possible to make it in the brief time in which they are held. It is not a question of desirability, but whether the people are ready for it.

Question.— What are the merits of beardless barley?

Mr. Van Alstyne.— I do not think that it is adapted to this locality.

Mr. Clark.— Mr. Wing of Ohio has recommended it as a nurse crop for alfalfa, but he does not consider it as good, for sowing alone, as other kinds.

Question.— How would you get rid of the wire worm?

Mr. Witter.— Practice a short rotation, cultivate thoroughly, and plow the ground just before winter.

Question.— In sowing turnips for a cover crop, when would you sow and when would you plow under?

Mr. Van Alstyne.— If sowed alone, about the last of July; if in corn at its last cultivation it will be earlier. I prefer leaving them till spring before plowing under.

Question.— Wherein does the grange benefit the farmer?

Mr. Shepard.— The most important way is in education. The school days of most of us are over, but in the grange we have an educational factor that we can never outgrow. Here we can discuss those problems that affect us and arrive at the proper conclusions. Another benefit is the social feature. The farmers are, by the very nature of their work, more or less isolated, but they and their families are brought together in the grange, for the ladies are admitted on equality with the men, and this social element is one of its important features. While the grange is not a political body, it has done something toward enacting favorable legislation, as in the case of the oleomargarine bill, and also in opposing such measures as are opposed to the farmer's interests. The chief benefit along the financial line is in the matter of fire insurance. The St. Lawrence county branch has been organized for twenty-five years and has now insurance amounting to over four million dollars in force. Its cost is only a fraction of that of the old line companies.

Question.— Please explain the provisions of the "Fuller Road Law."

Mr. Lyon.— This provides that any town may change from the labor system to the money system by a majority vote, and that an election for such purposes shall so request. The town adopting this plan will receive from the State a sum equal to fifty per cent. of the amount raised by tax in that town for road purposes not to exceed one-tenth of the assessed valuation, exclusive of the incorporated villages.

Question.— What education would you advise for the farm boy beyond that of the common schools?

Mr. Van Alstyne.— I think that if the time and money could be spared, a four years' course in agriculture at Cornell university or some similar institution would be of great benefit to the young man from the farm, but I do not consider such a course to be necessary for successful farming. However, I do think a shorter course of one or two years advisable; there the training to think and study is received. The short course of thirteen weeks for two years is not as good as one complete year, and I favor the idea which Dr. Schurman has advanced, that there should be a six months' course beginning in October and ending in April, which would give the young man an opportunity of working during the summer season.

Question.— What is the best cover crop to be sown in corn at its last cultivation?

Mr. Van Alstyne.— There are a number that are excellent, but I prefer a mixture of clover and cowhorn turnip. Use a half pound of turnip seed and two quarts of clover. The turnip is valuable as it can use plant-food that plants of a higher order cannot use. When the turnips decay they leave this in an available form for other plants to use.

Question.— What is the cause of the scarcity of farm help, and how can it be remedied?

Mr. Van Wagenen.— The constant tendency is for the farm help to drift away to the cities. One of the reasons for this is that city labor, as a rule, is better paid. The farm laborer of to-day has come to be more of a skilled laborer than ever before. The setting up and running of the machinery of the farm, the proper care of stock, and many other features of our work demand a degree of skill unthought of in the years gone by. The first step in solving the problem is to pay wages commensurate with the work demanded. The second thing that draws them cityward is the shorter hours. While the work of the city may be more exacting, its hours are regular. The old idea of working from sun to sun upon the farm must go. I believe that as much can be done in ten or eleven hours of labor, when knowing that there is a regular hour for quitting, than in the fourteen hours under the old system. We should not, however, adopt the rigid standard of the shops. Have an understanding when you hire that there are to be regular hours as a rule, but that if the occasion demands a little extra labor you will expect it. At the same time have your man understand that if he wishes to stop a little earlier on some special occasion he is welcome to do so. The spirit of mutual forbearance and Christian sympathy will do much to settle this problem. While the hired man should be treated as one of the family, and as not socially different, there are some unpleasant features that make it more desirable that they should have homes of their own on the farm. In this way you can get a family man of the best type and will be more likely to hold him permanently. It is not the strongest man that is the best, but the one who is able to use his strength intelligently. In no case would I have one who was habitually profane or user of foul language.

Question.— Is the hay loader a valuable implement for the farmer?

Mr. Van Alstyne.— It unquestionably is, where there is a large amount of hay and farm labor is difficult to get. I have used it for several years and am highly pleased with it.

Question.— Under the money system how shall the highways be kept open in winter?

Mr. Lyon.— If the funds raised are all expended before winter the snow must be removed from the roads so as to make them passable by the abutting property owners. The highway commissioner has the right to order such out to open the roads. The cutting of weeds on the highways must be done the same as under the labor system; they are required to be cut twice a year, before the fifteenth of June and September. With the money system no notification is necessary.

Question.— Is there any law to prevent the drawing of heavy loads over the highways in the spring of the year, when such drawing would seriously injure the roads?

Mr. Lyon.— Yes; the highway law explicitly states that the highway commissioner has the power to prohibit the passing of any traction engine or other heavily loaded conveyance whose passage when the roads are soft in the spring or fall would injure the highways.

Question.— What tile are preferable for drainage, round or square, glazed or unglazed?

Mr. Clark.—There is little choice between the round and square, although some authorities advocate the round. Buy the tile you can buy cheapest, whether round or square. If the glazed tile can be had at the same or a little higher price than the unglazed, use them; they should always be used at the outlet of the drain where the danger from freezing is greatest.

Question.— What shall we do with the boys?

Mr. Woodward.— Teach them business principles when they are young; teach them the value of money by giving them something to do on the farm that brings money; give your boy a plot of land and some animals, and one day out of the week to work for himself; teach him to save the money he earns and keep a bank account; teach him to be a gentleman, to dress and deport himself decently so that he can respect himself and command the respect of others; keep the confidence of your children by always keeping your word with them. The boys may be the best crop on the farm, if your work of training them is well done.

Question.— Which end of a fence post should be set in the ground?

Mr. Woodward.— It makes little difference, if thoroughly seasoned. Boiling in coal tar will prevent decay.

Question.— Can the English walnut be grafted upon the common black walnut?

Prof. Van Deman.— It is rather difficult, although I have seen it done in Oregon. Keep the scions on ice till the trees begin to leaf out; then keep the scions in a warm room till the buds start slightly before grafting.

Question.— How can we get an analysis of our soil?

Mr. Van Alstyne.— It is sometimes done at our experiment stations, but the more satisfactory way is to judge by the plant what is needed. A rank growth of straw indicates an excess of nitrogen; if the straw does not stand up well potash is lacking. Almost all soils may be improved by an application of phosphoric acid.

Question.— How should an asparagus bed be started?

Mr. Van Alstyne.— Furrow out about ten inches deep; put in a little well rolled manure mixed with the earth; have the plants set at a depth of six inches; work the dirt back gradually till the ground is level; cut nothing the first year, and only sparingly the second; after the second year you will have an abundance.

Question.— What is the value of leaf mould on sandy loam?

Mr. Cook.— It supplies the necessary humus or vegetable matter, but I believe it can be obtained much cheaper by plowing under some green crop.

Question.— How can we best poison the English sparrow?

Mr. Witter.— Write to Rufus Stanley, of Elmira, N. Y., enclosing a stamp. I cannot recall the method which he gave.

Question.— Is cabbage culture profitable?

Mr. Witter.— It is no doubt a good paying crop, but draws from the soil heavily. It is becoming a very important crop in many sections of the State.

Mr. Curtis.— In our section, where cabbage is largely grown, we practice plowing as early in the spring as possible, cultivating at least once a week to kill all the weeds. We also roll at least three times to make the soil firm.

Question.— What can be done for the club root in cabbage?

Mr. Van Alstyne.—A large grower in my section has used sulphur for two seasons with good results. He scatters it in the seed bed, dips the roots in it when pulled and puts a little in the hill when the plant is set.

Question.— Will anything prevent or cure the black rot in cabbage?

Prof. Stewart.— There is no known remedy. The Department of Agriculture at Washington have investigated the subject thoroughly and advise picking off the infested leaves at its first appearance repeating the operation once a week. We are studying this subject at the experiment station, but have not arrived at any definite conclusions.

Question.— How can we destroy cabbage lice?

Mr. Tice.— Kerosene emulsion will kill all it reaches, but I have found that where kept growing vigorously the lice are not so troublesome.

Mr. Curtis.— They usually appear first upon the weaker plants. Pull these and take them out of the field and you will largely prevent its spread.

Question.— How much salt can be sown to the acre without injuring new seeding?

Mr. Van Alstyne.— Salt has no fertilizing value, but it has a two-fold value as an agent. It contains a small amount of silicate, which tends to stiffen the straw. Salt also has a tendency to gather and hold the moisture. I have used 200 pounds to the acre without bad results.

Question.— Can the soy bean be profitably raised as far north as this (Wyoming county)?

Mr. Wing.— Undoubtedly. In Madison county a farmer has grown it with his corn for the silo; in this way he does not need to buy protein. It may be cut and put in silo or thrashed; the beans are as rich a food as oil meal; sow the sort that will mature in this latitude.

Question.— Is it profitable to grow rape for a cover crop after beans?

Mr. Van Alstyne.— I have had no experience with it after beans. Try it for yourselves in a small way. The turnip is better than the rape as it roots deeper and brings up mineral matter from the subsoil below which will feed other plants. Neither rape nor turnips will gather nitrogen from the air. It may be sown early in May and will make good pasture for young lambs, but the best results will be had by sowing the last of July for fall pasture.

Question.— Is it better to plow eight or nine inches deep, or five or six?

Mr. Van Alstyne.— Deep plowing is usually best, but you should increase the depth gradually.

Question.— Can you successfully tile drain land that is nearly level?

Mr. Wing.— It is a mistaken idea that a great fall is necessary; one inch of fall in a hundred feet is ample if the drain is properly made; do not use too small a tile; I would not use them less than three inches in diameter; the great point is to keep a uniform grade. The distance apart of the laterals will depend upon the nature of the soil.

Question.—Are goats profitable for a farmer?

Mr. Smith.— There are some Angora goats being kept in this State, and reports say they are profitable. I think the most profit comes from the selling the breeding stock.

Question.— What is your opinion of an agricultural course in correspondence?

Mr. Gould.— There is a reading corresponding course at Cornell, and another at Chautauqua, that have been found very valuable. I consider such course very valuable, and would advise all those who can to take it.

Question.— Does it pay to raise oats or any other variety of grain, except corn?

Mr. Smith.— You cannot afford to feed oats at the present prices for them, but you certainly can afford to grow them. It were more profitable to sell the oats and buy bran and gluten with the money, because a larger food value can be obtained in these foods for the same money. Oats do not remove as much fertility as does corn, as corn is a more gross feeder, but corn being a deep feeder, while oats are a surface feeder, leaves the soil in better condition than oats. Then, too, oats require more moisture than corn, and that moisture is all taken from near the surface of the ground.

Question.— What shall we do with land where the weed known as "paint weed" predominates?

Mr. Smith.— It has been found that an application of twenty bushels of salt broadcasted, per acre, will kill the wéed, but it will also kill everything else. So, if it was applied, one would have to lose the use of the land a year or two; plow and cultivate if possible.

Question.— Does it pay to underdrain land? Mr. Terry reported better crops of potatoes when grown on such land.

Mr. Smith.— In western New York much of the land has been underdrained, the soil being a heavy clay. It has been found that it pays for any crop.

Question.— What is the cost of tile, and what is the size usually laid?

Mr. Van Wagenen.— Two inches in diameter and thirteen inches in length. The cost is about ten dollars per thousand pieces.

Question.— About how much will it cost to underdrain an acre of land?

Mr. Gould.— It would depend on the land. Some would cost more, some less, depending on the grade and the depth necessary to go. But, as a rule, I think the cost does not, on the average, exceed thirty-five dollars per acre.

Question.— Is it of any benefit to have fertilizer on hops?

Mr. Van Dreser.— I have never been able to grow a crop on my farm unless I fed it. Why not feed hops? Surely, hops ought to be fertilized if a paying crop is expected, just as much as any other farm crop.

Question.— What will cure "barnyard itch" in cattle?

Mr. Gould.—Any one of the sheep dips will destroy it. Soap suds will also destroy it. If you apply that allow the cow to dry off.

Mr. Smith.— We had a case of it on a cow at the station. We treated it with a solution of corrosive sublimate and water, and gave iodide of potassium diluted in water as medicine. It cured the itch on the cow.

Question.— Do you approve of the various watering devices for cattle in the stable, and will cattle give much better returns by having water constantly before them or by getting it once a day?

Mr. Gould.— I am not here to advertise any water bucket or other implement. Some sort of device should be used in the stable so that the cow can get water at least twice a day. When a cow is turned out to drink but once a day she does not always drink, because she does not crave water, while at other times she will drink too much, and at this time of year will have to drink ice water. The amount of water a cow drinks in a day varies from 80 to 125 pounds. If she takes this all at one time, and if it is ice water, she will be compelled to eat from two to four pounds extra of corn meal to warm it up to the temperature of her body, a too expensive method. I prefer to water the cows in the barn at least twice a day, and to have the water not much above fifty-two degrees.

Question.— How about the "catch crops," drinking up the moisture?

Mr. Gould.— Catch crops in the corn will not absorb moisture enough to injure the corn, as they are sown so late. After the removal of the corn, however, having all the moisture present, they grow rapidly.

Question.— What can we grow as a catch crop of the legume family?

Mr. Gould.— The legumes are the clover, peas, beans, rape, the vetches and some other nitrogen catching crops. We get, as a rule, the best results as a cover crop from clover.

Question.— Have turnips any value as a cover crop?

Mr. Willard.— They will gather food that other plants will not; therefore may be of use in some soils. They will not gather any nitrogen, but are a good crop to grow to clean the land. I sow turnips thick and then harrow out part of them with the smoothing harrow.

Question.— Is there any way in which to destroy grasshoppers? Why cannot they be destroyed as the chintz bugs were in the West?

Mr. Wing.—The chintz bugs were never destroyed in the West as has been reported. Raise turkeys and fowls and let them take care of the grasshoppers.

Mr. Gould said that in Minnesota the farmers use "hopperdozers," a sort of sheet-iron pan attached to a sled with a canvas back. This canvas is saturated with coal oil, the hopperdozers scoop up the hoppers and carry them back to the oiled canvas; when they come in contact with that they immediately drop off and "kick the bucket." Several of these hopperdozers are used at once, thus going over a large area in a short time.

Question.— What should be done with the hired man who kicks and pounds the cows?

Mr. Smith.— Discharge him just as quickly as possible. The misuse of the cows by the hired man by dogging them means less milk every day as well as diseased milk. Don't keep a brutal hired man nor a vicious dog, both will be kept at a loss.

Question.— We have been troubled of late with bugs in our beans; what preventive is best? Would spraying the blossom be of any value?

Mr. Smith.— I do not think that spraying the vines when in blossom would kill the fly that stings the bean, but those men who grow large quantities of beans, and our large seedsmen, treat the beans with bisulphide of carbon. A small quantity of it is put into a saucer and placed in the bin, barrels, or bags, and covered closely. The carbon develops a deadly gas, which, being heavier than the air, sinks and thus goes all through the beans, killing the bugs quickly. Do not breathe it, nor go near it with fire, as it is not only a deadly poison but highly explosive. It may be obtained at nearly every drug store and costs but little.

Question.— What kind of oil is the best to soften a harness?

Mr. Wing.— A harnessmaker told me to get the regular black machine oil that is made from petroleum.

Mr. Royce.— First clean the harness thoroughly, then use harness dressing; it makes the leather soft and pliable, and lasts quite long.

Question.— In building a new barn, would you have the cows face each other or in the opposite way?

Mr. Gould.— That would depend wholly on the conveniences. Some men prefer one way, some another; I think about all the difference is in the amount of walking one does in feeding the cows and the removal of the manure.

Question.— Does the angle worm do any harm to house plants, especially geraniums? If so, in what way?

Mr. Wing.— Too many angle worms, while they do not attack the plants, destroy humus; but if a soil does not have angle worms, as a rule, it is a poor one. Usually the women do not care to view angle worms. I suppose their objection dates back to the garden of Eden, but there is no doubt but some angle worms in a soil are beneficial.

Question.— I have black muck three to ten feet deep, oats fall down before they fill, corn blows down before ears mature, timothy stays only two seasons; what is the trouble, and what is the remedy?

Mr. Smith.— The evidence goes to show there is not enough potash in the soil, but too much nitrogen. Potash adds strength to the straw, nitrogen produces growth; add some lime to release potash not available and to sweeten the soil. If there is acid enough to turn blue litmus paper, red clover will not grow, while some other grasses or crops will.

Question.— How long should a clover meadow be left before plowing it for corn?

Mr. Wing.— One must first know the nature of the clover plant. It is a biennial, that is it usually dies at the end of the second year; sometimes, however, some of the plants struggle along to make seed, so it is not advisable to keep a clover meadow longer than two years. If you want a clover sod on which to plant corn, do not sow any timothy seed with the clover seed.

Question.— I am troubled with fine "silt" working into the joints of my tiles and clogging them in the drains. What is the remedy?

Mr. Wing.— I should think that you had not laid the tile deep enough. I would recommend the taking up of the tile and relaying them. We have eight miles of tile, but do not have any trouble with it. Do not make the mistake of allowing any loose joints for the purpose of letting the water get in; make the joints as close as possible.

Question.— What is the best time of the year in which to plow greensward for corn in St. Lawrence county?

Mr. Gould.—As soon as it thaws out. A sod plowed in the fall will not change physically till spring, so I would not plow for corn until spring.

Question.— What varieties of vegetables would Mr. Rice recommend for a succession for family use?

Mr. Rice.— For peas it is better to sow several varieties at the same time for a succession, rather than one variety at different times; the Alaska, Knot's Excelsior, Burpee's Profusion and Telephone will succeed each other in the order named; for the best results plant them deeply. For a succession of tomatoes plant Fordhook's, Crimson Cushion and Ponderosa. For sweet corn we have found the best succession to be Early Maine, Moore's Concord, Stowell's Evergreen, Country Gentleman and Mammoth Sugar. Plant Green's Prolific cucumber for pickling and White Spine for slicing.

Question.— What are the relative values of rye and oats for plowing under?

Answer.— Rye adds much humus, but little fertility; it should not be allowed to grow late in the spring. Oats are good if sowed about September first; they take up plant food and hold the snows of winter.

Question.— How can oat smut be prevented?

Mr. Dawley.— The hot water treatment is the one which we have used most on our own place. In this the oats are submerged in water which stands between 130 degrees and 135 degrees Fahrenheit, and kept in this bath for fifteen minutes. Hot water is added from time to time as is necessary to keep up the temperature. The danger of overheating the oats and thus reducing their germinating power, or of not having the water hot enough to kill the smut spores, leads me to believe that the formalin treatment, which is of more recent introduction, is better for most of us to use. Formalin can be purchased at nearly all drug stores at from forty to fifty cents a pint, and a pint is enough for fifty gallons of water. This should take care of from forty to fifty bushels of oats. There is no other expense except the labor. One ounce of formalin in three gallons of water will treat three bushels of seed. Have the oats thoroughly cleaned and placed in piles of six bushels on a tight floor and sprinkle with the formalin solution, using a common watering pot, and mix by thoroughly shoveling. Use half a gallon of water per bushel for the first sprinkling, then shovel the grain over, using the remainder of the gallon per bushel, as soon as the first has soaked in so it will not run off. The grain should be thoroughly shoveled over again as soon as this is put on to the first quantity of grain and shoveled aside, and another amount treated in the same manner, continuing this until all is treated. It can be left in piles eight or ten hours; no harm will result if left over night. It is a good plan to cover the piles over with coarse sacking, or some loose cloth which will allow the heat to rise. The next day the grain should be spread and shoveled over occasionally, exposing to the air and drying it out in shape so that it may be drilled readily.

Question.— Why does New York need an agricultural college?

Mr. James Wood.— To aid her in maintaining her position.

Every observer, even the most superficial, is aware of the severe struggle for existence that the agriculture of the Eastern and older States is making against the flood of products from the boundless and teeming West. New York is holding her own in this struggle better than any of her sisters because of the unequaled variety of her agricultural interests. It is doubtful whether a greater diversity can be found in either America or Europe. This was strikingly illustrated in her exhibit at the great Columbian Exposition in 1893.

Every interest in the State, whether the consumers in the cities, the transportation companies, by land or by water, or the manufacturers of all sorts, are benefited by this, and all will doubtless be glad to lend their assistance to enable New York to continue to be the first in population and wealth, the first in commerce, the first in manufactures and the first in the importance and value of its agriculture. The great fact of the complexity of our agricultural operations makes necessary a higher and more thorough training than is required by the farmers of any other State.

Those that produce a few things like grain, or dairy products, or cattle, or live stock, have comparatively simple problems to solve. In addition to these, New York has a leading position in all kinds of Northern fruits, in sugar, honey, medicinal and aromatic herbs, garden seeds, field crops of beans, hops, tobacco, market gardening stuffs, forestry, etc. She proposes to hold each and all of these; but she cannot do this without special equipment. Her people have the brains, the courage and the muscles, but these must be taught for their best achievement. The State has done wisely in providing for farmers' institutes and experiment stations, and these are very good, but they do not go far enough. An agricultural college, strong, rich, well equipped, is a necessity to supplement these. She must have it, and Cornell University is the place, and the only place for it.

Some may say that the university should do all this. She has been richly endowed and liberally provided for by the State. True, but the demands upon such an institution for learning are always greater than her ability. The trustees and faculty do all that is possible for them, but we, the people, want more. We must provide the means for this ourselves.

Question.— Which is best, life in the city or country?

Answer.— That depends, we cannot all live in the country, but for me, I'll take country life.

The tendency of city life is to deteriorate physical and moral manhood. There is more refinement, but less vigor in city life; more culture and grace, but less hardihood. The grit and pluck of the world have ever come from the country. The noises, unnaturalness, and perpetual excitement and undue stimulation of city life tend to impair the nervous system seriously. Many a city young man's health is totally wrecked and his whole career dwarfed or hampered by these artificial conditions. This difference between urban and rural health is immeasurable. No one can afford to take the chances of personal deterioration which comes from living constantly in a city. Think of breathing for a lifetime the air of a city, saturated with all sorts of gases and poisonous fumes, and of inhaling the smoke from factories, the unhealthy exhalations of a million human beings, and tens of thousands of animals. Compare this vitiated, lifeless, poisoned air with the crisp, tonic, invigorating atmosphere of the country, pure and fresh from the laboratory of the Great Chemist, untouched by disease, untainted by the breath of infection.

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